Vol. XXVIII. Part 7.

NATIONAL MUSEUM OF VICTORIA

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The Journal of the Department of Agriculture of Victoria, Australia.

July, 1930.

PRINCIPAL CONTENTS

Rose Diseases and their Control

Codling Moth Control—Spraying Tests

Burnley Egg-laying Competition—Details of Final Results

Sheep Farmers' Field Day

Fumigation of Citrus Trees—Results of Six Years' Work

Rochester Irrigation Farm Competition

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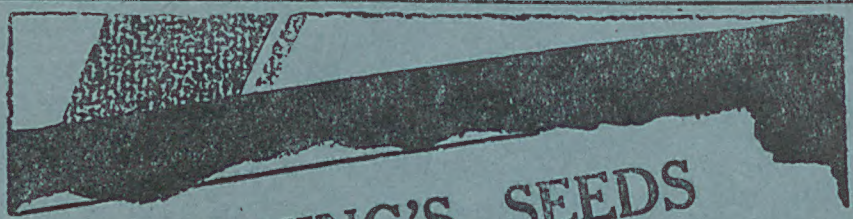

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OF

THE DEPARTMENT OF AGRICULTURE

VICTORIA, AUSTRALIA.

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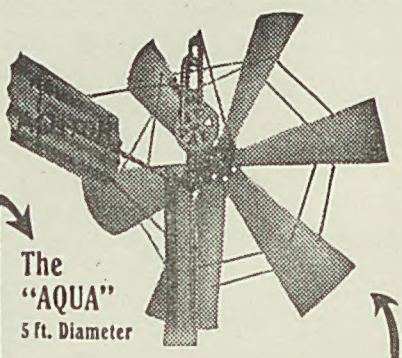

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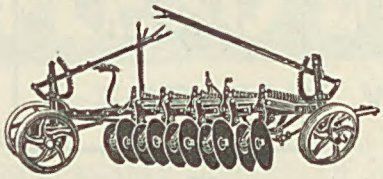

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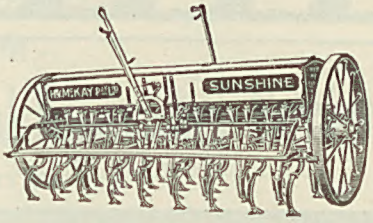

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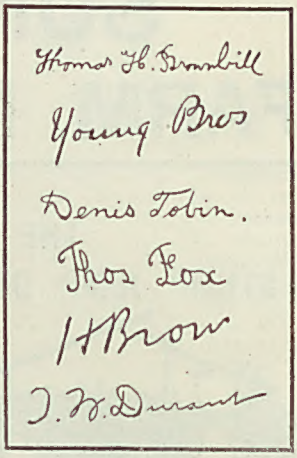

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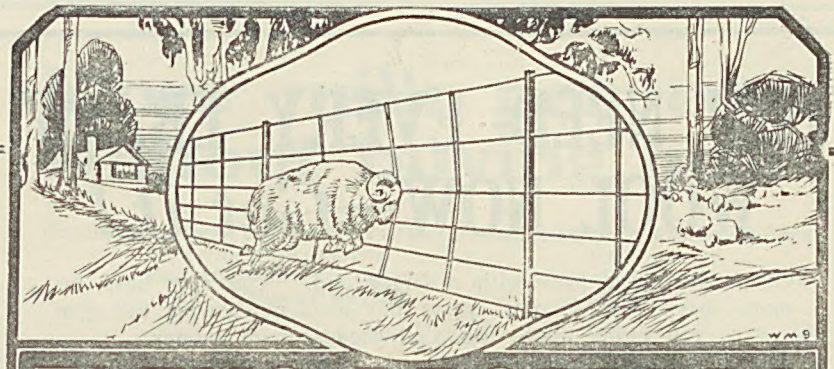

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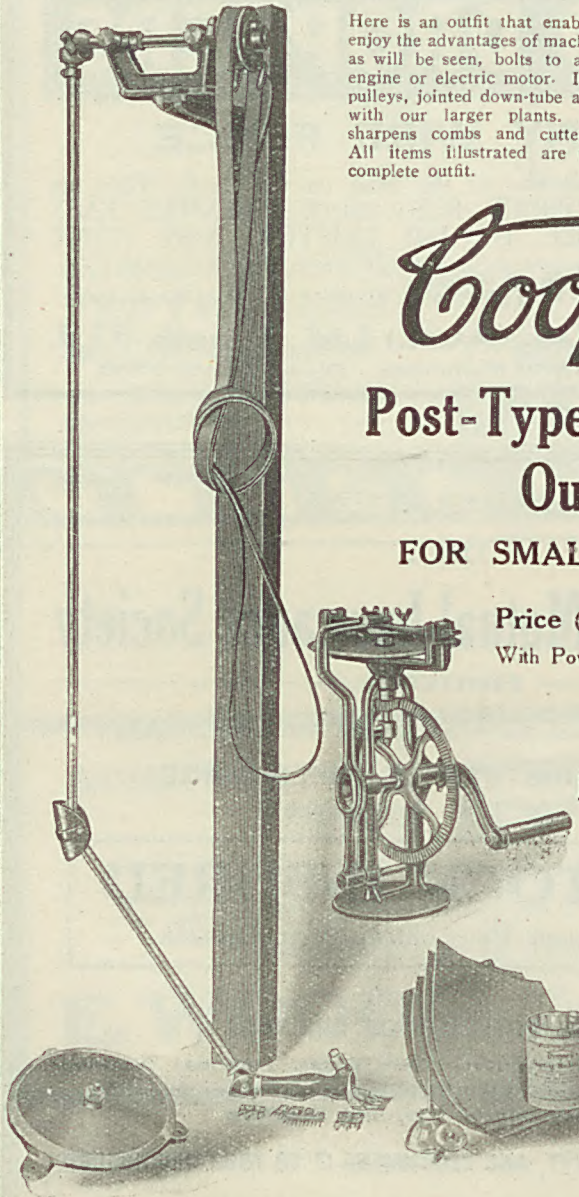

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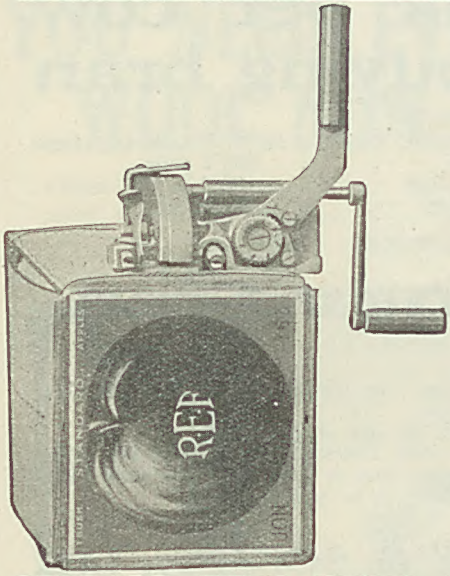

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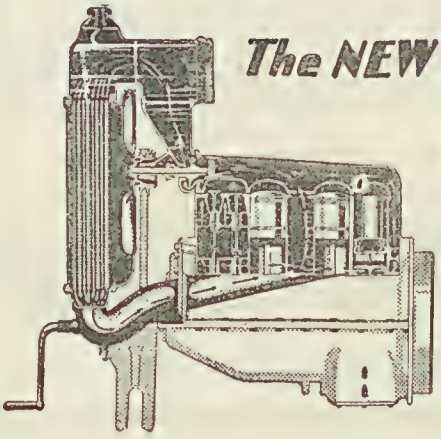

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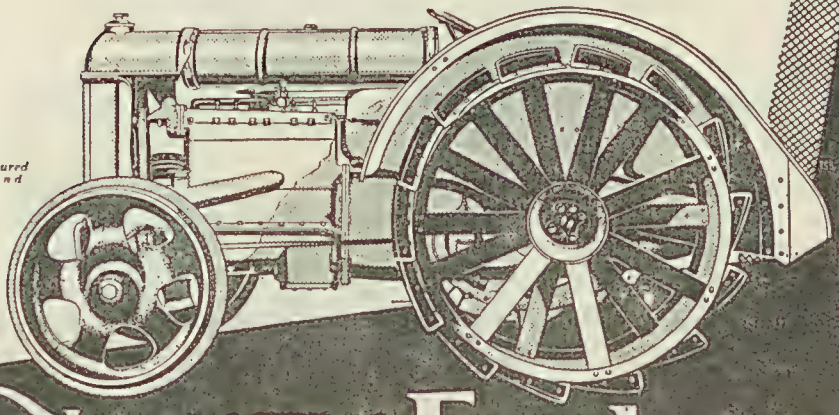

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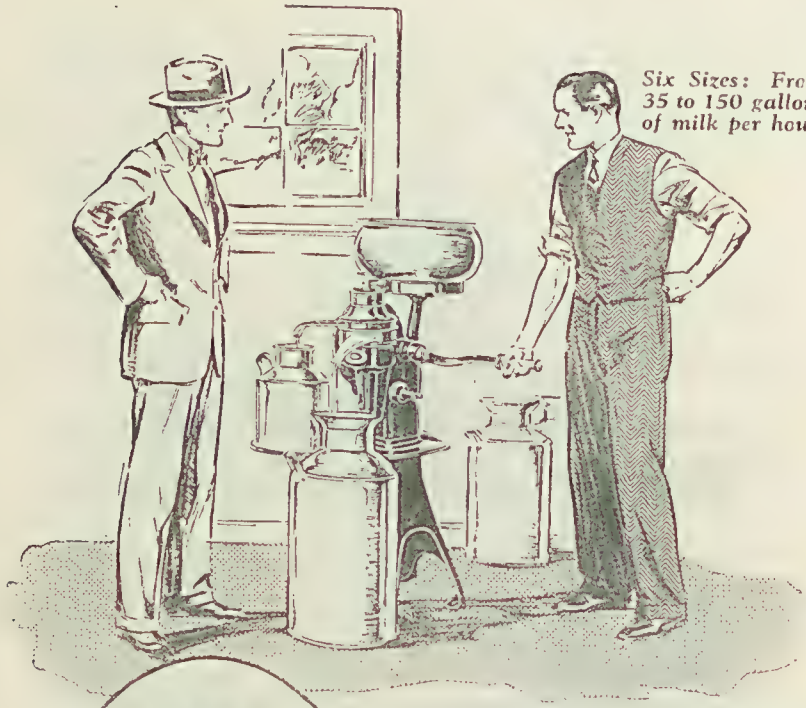

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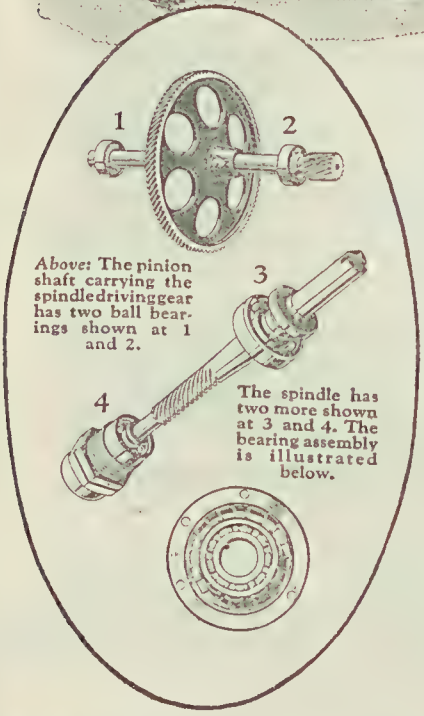

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THE JOURNAL

OF THE

Department of Agriculture

OF

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Vol. XXVIII. July, 1930. Part 7

ROSE DISEASES AND THEIR CONTROL.

By B. J. Grieve, M.Sc.

(National Rose Society's Research Scholar, Fred. Knight and Wyselaskie Scholar.)

Early in 1929, the writer was appointed to carry out researches in rose diseases in Victoria, under the terms of the National Rose Society's Scholarship. The work, which was begun at the Botany School, Melbourne University, was concerned mainly with an investigation of the cause of our most serious rose disease, namely, Rose Wilt and Die-back, and with observations on the incidence, distribution, and severity of this and of other rose diseases present in the State.

As it was necessary to know whether the disease Rose Wilt and Die-back had been previously described in any other country, an examination of the literature on the subject of rose diseases was made early in the year. Great difficulty was experienced in tracing the necessary literature, and after all the references had been examined and catalogued it was felt that it would be a great help to future investigators if a comprehensive survey of all known rose diseases that are economically serious was made. In the following pages are given the correlated results of work on rose diseases from very early times up to the present. The sphere of usefulness of this survey is extended by the fact that Rose Wilt and Die-back, which has formed the main subject of the writer's research, is described, and also by the fact that it sets out for the first time the position in regard to rose diseases in Australia.

In the case of each disease the history, distribution, economic importance, symptoms, etiology, and methods of control are dealt with. A bibliography of the sources of information regarding each is given, together with references to early papers on the parasitic organism causing the disease. As regards the world distribution and the relative economic importance of the deseases discussed, it is realized that these records are far from complete; the question of the distribution and importance of rose diseases in Australia, however, has been gone into more fully, and the writer is indebted to the plant pathologists in the various States for their co-operation.

Since this account is written with an Australian outlook, those diseases which are present in Australia are given priority, although others may be more serious elsewhere.

The control measures advocated in connexion with each disease are those that up to the present have been found most efficacious, and experiments have shown that they may be applied with considerable success by rose-growers in this country.

I.—MILDEW OF ROSES.

Mildew is probably the commonest and most serious disease of the rose. Owing to its widespread character, and because of the unsightly appearance it causes to both foliage and flowers, much attention has been given to its control. Research in this direction has been along the lines of breeding for immunity, and of perfecting fungicides. Rambler roses and related forms are considered by Eriksson,[7] Brooks,[1] and Curtis[3] to be the most susceptible. Wichuraiana roses are much more resistant to mildew. Easlea[6] gives a list of mildew-resistant roses, and among them are included varieties from the main classes, e.g., *H.T.'s*: General McArthur, Ophelia; *Teas*: Maman Cochet, Rainbow; *Pernetianas*: Golden Emblem, Constance. Easlea advocates the breeding of new plants, using parents which have mildew-resistant foliage. Hybridists in various countries have endeavoured to produce such resistant roses, but with no outstanding success. Alister Clark in Australia, after many years' work, finds that in seasons favorable to mildew few of the reputedly resistant roses escape.

Names Applied to the Disease.

Powdery Mildew is the name which has been most commonly applied to this disease, but recently the British Plant Pathology Committee[19] has adopted Mildew as the standard common name.

History and Distribution.

The disease was first described in Germany in 1819, and since then has been recorded in most European countries: Britain (1823), France (1829), Sweden (1840), Belgium (1865), Portugal (1884), Italy, Spain, Austria-Hungary (1885), Denmark, Russia, Netherlands (1889). It is also known in Asia, Cyprus, Transcaucasia (1897), India (1879), and North and South America. Mildew was first recorded for Australia in 1892 by Cooke[2] (in Queensland). McAlpine[16] noted its occurrence in Victoria and New South Wales in 1895, while Osborn[18] recorded it for South Australia in 1912, although it was no doubt present in this State long before that time. The disease is also present in Tasmania and Western Australia. Latterly it has been reported as occurring in Mexico (1921), Argentine (1922), and Mauritius (1924).

Symptoms.

In the spring the presence of the disease is indicated by greyish white spots on the leaves and young shoots. Later in summer these spots have a white powdery appearance. Towards winter the mildew appearance is lost, and the spots show a dingy white colour. These spots also appear on the stems of affected plants, particularly about the bases of thorns. A feature of the disease during a severe infection is the dwarfing and curling of young leaves, stems, and buds. Defoliation may occur under conditions favorable to the disease.

Etiology.

Rose Mildew is caused by the fungus *Sphaerotheca pannosa* (*Wallr.*) Lev. *Rosae Wor.*

Identity.

It was first reported by Wallroth[23] in Germany in 1819, and was given the name *Alphitomorpha pannosa.* Later it was re-named by different workers as follows:—*Eurotium Rosarum* by Greville,[9] *Erysibe pannosa* by Schlechtendahl[22] and Link,[12] and *Erysiphe pannosa* by Fries[8]. In 1851 Léveillé[11] placed the fungus in the genus Sphaerotheca, and the connexion between the conidial (*Oidium leucoconium* Des.) stage and the perfect stage was realized the same year. The fungus has since been retained in the genus Sphaerotheca, although De Bary[4] in 1870 re-named it *Podosphaera pannosa,* and Kuntze[10] in 1892 called it *Albigo pannosa.* The species is sharply marked off from the other

Fig. 1.—Rose Mildew. [*Photo. by B.J.G.*

members of the Erysiphaceae by its pannose (ragged) satiny patches of persistent mycelium in which the perithecia are usually completely immersed. The perithecia are usually found in the characteristic pannose patches on the petiole, or at the back of the midrib and not scattered over the surface of the leaf. Salmon[21] states that a fungus causing Mildew in the United States is a different species, namely *Sphaerotheca humuli,* although it goes commonly under the name of *S. pannosa.* Smith[24] in America supports this view, and states that *S. humuli* attacks mainly Tea roses producing a more delicate mycelium than does *S. pannosa.* He has found only the conidial stage of *S. humuli.* Stewart,[25] also working in America, reports numerous cases of Rose Mildew where the fungus is without doubt *S. pannosa.*

Rose Mildew was believed to occur on other plants besides roses, e.g. on apricot, peach, and almond, but in 1914 Woronichin[27] proved that this was not the case. He experimented with the fungi causing

Mildew on roses and peach trees, and found that inoculations of the rose Mildew onto peach trees were in all cases unsuccessful and vice versa. After making a close study of the morphology of the two fungal types he stated that they showed differences in the size of perithecia, asci, and spores. Thus on biological and morphological grounds he separated the species into *S. pannosa Rosae* and *S. pannosa Persicae.* Skorić[23] in 1926 also showed that this was so.

Morphology.

Mycelium persistent, forming on the stem, petiole, calyx, and rarely on the midrib at the back of the leaf; dense satiny patches, at first shining white, but often becoming grey, dingy buff, or rarely pale brown, composed of densely interwoven special hyphae (width 6μ) sparingly branched, somewhat rigid, refractive and thick-walled, with

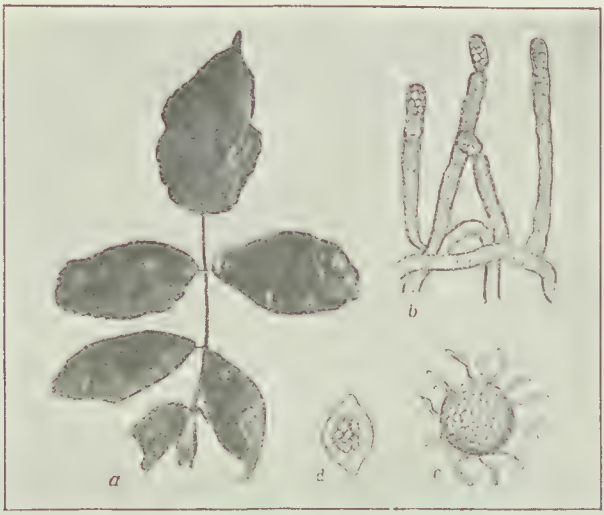

Fig. 2.—Rose Mildew. (After Eriksson.)

a. Mildew on leaf. *b.* Conidia. *c.* Perithecium. *d.* Ascus containing spores.

the lumen becoming obliterated; perithecia more or less immersed in the persistent mycelium, globose to distinctly pyriform, 85—120μ in diameter; appendages few or absent, short, tortuous, pale brown, septate; asci 100 x 60-75μ; spores 20-27 x 12-15μ. The conidial stage of *Sphaerotheca pannosa, Oidium leucoconium* Desm., occurs on the upper surfaces of the leaves and is the stage which is responsible for the disfigured appearance of affected roses.

Life History.

The connexion between the oidial stage and the perfect stage of Sphaerotheca has been definitely established, but interest centres in the overwintering of the fungus. The fact that sexual spores are produced scantily tends to support the view put forward by some that the mycelium is perennial, i.e. the fungus reappears in successive years on the same shoots of affected roses. Salmon,[21] examining patches of *S. pannosa* on rose bushes found no signs of an internal mycelium. He stated also that the fresh centres of the disease which appeared in the

spring did not occur at the places where the fungus grew the previous year. Norton[17] believes that the mycelium of the fungus is able to winter out of doors in the buds of roses, while L. Massey[15] considers that in countries with warmer climates the fungus may be carried through the year in the asexual stage. This appears to be the case for the overwintering of the fungus in Australia. The perfect stage of the fungus has not been recorded for Australia.

The primary infection in the spring may be brought about by ascospores, or by conidia which have overwintered in sheltered positions, either in the open, or on potted plants in greenhouses. There appears to be no definite evidence favouring the idea of a perennial mycelium. Secondary infection is brought about by the conidia which are produced abundantly in spring and summer, and which are easily spread by the wind.

Rose Mildew varies in intensity from summer to summer, and is often more severe in a dry season. The disease occurs in Australia wherever roses are grown, but owing to our great climatic range there are regions where it causes considerable damage, and other parts where it is not economically important. Thus in Queensland (Brisbane division) the even temperatures are not so conducive to Mildew, although this is counterbalanced to a certain extent by the humidity in the summer. In South Australia (Adelaide division) temperatures are high in the summer and the winters are usually severe, while frequent changes of temperature occur during the growing season predisposing to Mildew. North-west Victoria and south-west New South Wales come approximately into the same climatological zone as South Australia. The climate of the eastern coast of New South Wales is influenced by warm ocean currents coming down from the north, and by moisture-carrying winds passing in to the mountains. The relative humidity is very high, and Mildew is frequently present on roses, but seldom in epidemic proportions. Southern Victoria (Melbourne region) has a less equable climate, and Mildew is often present in epidemic form in autumn and late spring. Little is known regarding the prevalence of mildew in West Australia or in Tasmania, but both of these States possess climates which, though vastly different in type, do not favour the spread of Mildew in epidemic proportions.

Control.

Mildew can be adequately controlled by spraying or dusting with fungicides, but repeated applications of these are necessary. Massey[15] and Stewart[25] recommend sulphur-lead dust, consisting of sulphur and lead-arsenate powder mixed in the proportions of 9 parts of sulphur to 1 part of lead-arsenate. The sulphur-lead dust should be fine enough to pass through a 300 mesh sieve, and the sulphur may be dyed green, to avoid discolouration of the foliage. Roses should be dusted from the time of unfolding of the first leaf buds before the disease begins to manifest itself. Dusting should be thorough and be done in the early morning or in the evening when the air is still. It is not necessary to have any moisture on the leaves when using sulphur-lead dust. The lead-arsenate has a twofold value in that it kills off insects, and also helps to make the sulphur adhere to the foliage. The manner in which the sulphur exercises its toxic action is still a matter for debate, but the views of

different workers may be summed up as follows:—1. The sulphur is oxidized to sulphur-dioxide and this is the toxic agent. 2. Sulphur acts as the solid form which, being in an extremely fine state of division, is called "particulate sulphur." 3. The sulphur action is due to direct toxic activity; also, the action may be partly mechanical[14]. Marsh[13] has recently put forward the view that the toxic action is due to the formation of hydrogen sulphide.

Other fungicides considered effective by Brooks [1] are:—Lime sulphur of specific gravity 1.005, and also sulphuric acid (1 part in 1,000 of water). In greenhouses, mildew can be controlled by sulphur-lead dusting, or by painting the pipes with a sulphur-lime mixture, the sulphur becoming gradually vaporized.

The addition of potassium sulphate to the soil is considered by rose-growers to be instrumental in keeping Mildew in check.

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II.—BLACK SPOT OF ROSES.

Black Spot disease of roses was first described in Italy in 1824, and since that time it has continued to grow in importance, so that it now ranks as one of the most serious of rose diseases.

While most roses seem to be susceptible, some varietal resistance is shown, and Scribner[20] in 1887 stated that roses with thick rough leaves were more liable to attack.

Laubert and Schwartz[10] considered that bush roses were more susceptible than climbers, and also that those with thin leaves were more commonly affected.

L. M. Massey[12] in 1918 stated that practically all Bush roses, H.P.'s, H.T.'s, and Pernetianas, were more or less susceptible, while the Multiflora and Wichuraiana types were comparatively free from attack. He considered that hybrid *Rosa rugosa* and moss roses were rarely affected, and he suggests that Scribner (*vide supra*) probably confused an abnormal condition of the leaves of moss roses known as bronzing with Black Spot. In a paper, in 1928, Massey and Westcott[13] indicate that all classes of roses in the United State are susceptible to the disease. The Austrian Briars and Polyanthas are believed to be the most susceptible, with the Pernetianas, Hybrid Teas, and Perpetuals scarcely less so.

Massey modifies the statement regarding the rugosas and moss roses made in 1918, and writes, "The rugosas and mosses may come further down the list, but even these are often severely spotted." Climbers, too, are considered to be as susceptible as bush roses. The difficulty of classifying varieties according to susceptibility is stressed, owing to variations in the factor of disease escape.

Dodge,[6] in a recent paper, states that Hybrid rugosas and climbers are moderately resistant, and need no protection under ordinary conditions.

Black Spot lesions occurring on the stems of roses in England were described in 1918 by N. Alcock[1]. She noted that Hybrid Tea roses were particularly susceptible to this type of infection. Massey and Westcott[13] in 1928 stated that soft-wooded varieties such as Los Angeles, Golden Emblem, and Madame E. Heriot were very susceptible to stem infection in the United States of America.

Climbers and Hybrid Perpetuals were also affected. In Australia, stem lesions due to the fungus causing Black Spot are known, but no reliable information is as yet to hand regarding the relative susceptibilities of the different classes of roses.

Names Applied to the Disease.

This disease has been variously described under the following names:—

> Black Spot, Leaf Blotch, Star-shaped Leaf Spot, Rose Actinonema, &c. The British Plant Pathology Committee[17] has adopted the name Black Spot as the standard common name.

History and Distribution.

Black Spot of roses was first described in 1824 in Italy, and since then references to it have become more and more numerous. Saccardo[19]

in 1884 noted the occurrence of the disease in France (1826), Britain (1877) Germany (1869), Austria (1884), Italy (1824), Belgium, and Portugal. Fries[8] recorded it for Sweden in 1849. Scribner[29] described the disease in the United States of America in 1887, while in 1889 both Humphrey[9] and Maynard[14] recorded observations on the disease. Subsequently, the disease was recorded from most parts of America. McAlpine[15] noted its occurrence in Australia in 1895 (Victoria and Queensland).

It, no doubt, made its appearance in the other States as well about this time, but no definite record can be found. Cobb[5] in 1903, in describing another leaf spot, refers to Black Spot, from which we may infer that it was present in New South Wales well before 1903. It was recorded for South Australia in 1912 by Osborn.[16] Averna Sacca[2]

Fig. 3.—Black Spot of Rose. [*Photo. by B.J.G.*

reports the occurrence of Black Spot in Brazil in 1926, while the disease has also been found in British Guinea (1924) and Czecho-Slovakia in 1926.

SYMPTOMS.

The disease is characterized by the presence of black spots on the leaves. These spots are more or less circular in outline, and have a very irregular fibrillose border, due to the radiating strands of mycelium which occur beneath the cuticle.

Plants which are attacked become defoliated early in the season, and the leaf buds, which should remain dormant till the following year, often open late in the season. The plant is thus left rather susceptible to winter frosts, and is also weakened, so that it blossoms poorly, or not at all, in the following season. Black Spot disease is serious, not only on account of the unsightly condition of the foliage,

but also because the loss of leaves brings about a condition known as "die-back." The reason for this is that the plant, having insufficient leaves wherewith to manufacture food, begins to starve, and a "die-back" condition is begun.

Besides appearing on the leaves, the fungus may manifest itself on the stems of rose-bushes. The infected areas present a blackened, blistered appearance, dotted with pustules. The fungus forms a stromatic cushion or pad below the cuticle.

Etiology of the Disease.

The fungus causing Black Spot is *Diplocarpon Rosae* Wolf, this being the perfect stage of the conidial form *Actinonema Rosae* (Lib) Fries. The conidial stage was first described and named *Erysiphe radiosum* by Fries[7] in 1824. Libert[11] changed it to *Asteroma Rosae* in

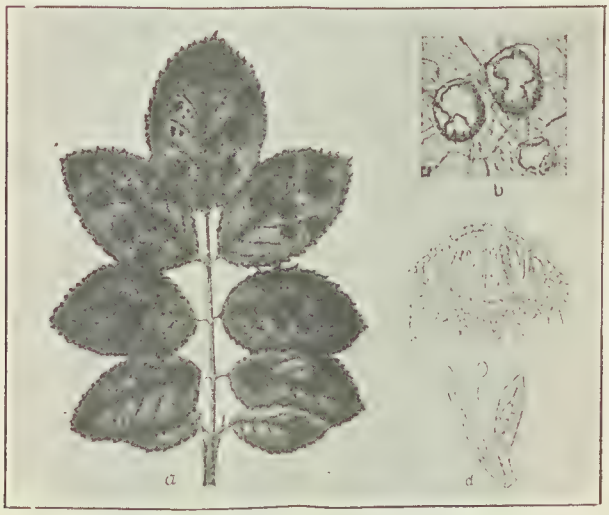

Fig. 4.—Black Spot of Rose. (After Eriksson.)

a. Black Spot on leaves. *b*. Perithecia. *c*. Section through a perithecium. *d*. Ascus containing ascospores.

1825, while Rabenhorst[18] in 1844, renamed it *Asteroma radiosum*. Fries[7] in 1849 transferred the fungus to the genus Actinonema, calling it *Actinonema Rosae* (Lib) Fries. Included in the synonymy are *Dicoccum Rosae* Bonorden[3] 1852, *Marsonia Rosae* Trail[22] 1889, Briosi and Cavari[4] 1889.

In 1912 F. A. Wolf[23] discovered the perfect stage of the fungus in the United States of America, and named it *Diplocarpon Rosae*.

Morphology.

The vegetative body of the fungus consists of two parts, viz., the subcuticular mycelium and the internal mycelium. The subcuticular

mycelium is immediately underneath the cuticle, being above the outer wall of the epidermal cells. It consists of branched radiating strands of mycelium, which anastomose making a network. The internal mycelium penetrates the mesophyll of the leaf and furnishes nutriment for the subcuticular part. It is connected with the latter by occasional hyphae which penetrate the epidermal cells or pass between them. Acervuli* are formed between the cuticle and the outer wall of the epidermal cells, and are therefore flattened. The stroma of the acervulus is on the epidermal cells, and consists of a very thin layer of small hyaline to yellow, pseudo-parenchymatous cells. There is no wall over the acervulus. Conidiophores are not prominently differentiated in form, while the conidia are hyaline, 2 celled, oval 18-25

Fig. 5.—Black Spot Lesions on Stems of Roses. (After Massey and Westcott.)

x 5-6 μ. The pressure of conidia formation ruptures the cuticle. The colour of the spots is due to the disentegration of the cells.

Perithecia develop on fallen leaves, and are spherical to disciform, 100-250μ in diameter.

The upper part or shield is dark-brown, subcuticular, and formed in connexion with the radiating strands of mycelium. The lower part of the fruit body is disciform and sub-epidermal. The margin breaks through the epidermis and becomes connected with the shield. These fruit bodies are closed at first, but later open by the rupturing of the shield together with the upper part of the apothecium in an irregular

* Acervulus—a little heap of sporogenous tissue.

stellate manner from the center. Asci oblong or subclavate, narrowed abruptly above, 70-80 x 15μ, 8 spored, paraphyses slender, enlarged abruptly at the tip. Ascospores oblong, hyaline, unequally two celled and constricted at the septum, 20-25 x 5-6μ.

Acervuli on the Stems.—The fungus forms a stromatic cushion beneath the cuticle and the developing hyphae rupture the cuticle. Short conidiophores bearing conidia similar to those found on the leaves develop in the spring.

Life History.

The conidial or actinonema stage of Black Spot was connected with the perfect stage in America in 1912, and one solution of the problem of overwintering of the fungus was given. The ascospores are set free from a pore at the top end of the ascus, and they accumulate in whitish masses in the open mouths of the perithecia. They are set free in the spring, when the leaf buds are beginning to unfold, and then are carried by wind or splashed by rain on to rose leaves. Provided that they have sufficient moisture and the temperature is suitable, they germinate and produce the disease anew.

Prior to 1912, when only the asexual stage was known, the mode of overwintering was doubtful. Scribner[20] thought that the asexual spores lodged on the buds in the autumn, and remained dormant there until the leaves expanded in the following spring. Continued and close search has failed to demonstrate the presence of perithecia on rose leaves in England. The fungus, however, overwinters there by the more hardy conidia borne in the acervulae on the rose stems, this being demonstrated by Alcock[1] in 1918. This method of overwintering is present in America, and is also known in Australia. Whether perithecia are formed on fallen rose leaves has not yet been determined in Australia. The distribution of Black Spot in Australia is practically the same as for Rose Mildew.

Control.

Black Spot is an enphytotic* and epiphytotic† disease. Certain seasons favour the spread of the fungus leading to an epidemic.

Control measures in this disease aim at prevention rather than cure, and success can be achieved by a timely application of a suitable fungicide. Massey[12] experimented with various fungicides, and showed that dusting with a sulphur-lead mixture (9 parts of finely powdered sulphur to 1 part powdered lead-arsenate) effectively controlled the disease. He recorded only a 7.66 per cent. infection using this fungicide. Lime-sulphur and Bordeaux mixtures he also found to be effective, but a disadvantage of these is that they discolour the foliage. The times and frequency of application are the same as described for Mildew. Roses should be planted well apart, in sunny positions, and care should be taken to sweep up and destroy fallen leaves.

* Enphytotic.—Disease present throughout the year in mild form.
† Epiphytotic.—Epidemic type of disease.

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(To be continued).

WORLD'S GRAIN EXHIBITION.

To be held in Canada during 1932.

Arrangements are being made for the holding, during 1932, of a World's Grain Exhibition and Conference at the city of Regina, which is the centre of the largest wheat area in Canada. The exhibition has the support of the Canadian Federal Government and of the Governments of the Provinces, and prizes of a total sum of £40,000 are being offered for exhibits of wheat, barley, maize, &c. Entries will be received up to the 1st March, 1932, and exhibits must be in the hands of the exhibition authorities not later than that date, so as to afford ample time for judging. The display will be opened on the 25th July, and will continue until the 6th August. Full particulars may be had from the Canadian Trade Commissioner, 90 Queen-street, Melbourne, C.1.

SHEEP-FARMERS' FIELD DAY.

(Arranged by Ballangeich and Ellerslie Sheep-farmers Association.)

The Ballangeich and Ellerslie Sheep-farmers Association held its Field Day for this year on the 26th of May, on the property of Mr. E. J. Brumley, "Koonje," Ballangeich. The programme for the day included:—

(1) Sheep judging by members.
(2) Demonstration and lecture on Stud Polwarths, by Mr. A. W. Dennis, of "Tarndwarncoort," Warncoort.
(3) Demonstration of the correct way to make a post-mortem examination of sheep, and a lecture on Sheep Diseases, by Mr. R. N. Johnstone, B.V.Sc., Senior Veterinary Officer.

By invitation of the Ballangeich and Ellerslie Association several members of the Hawkesdale Sheep-farmers Association were present, and participated in the programme. The total attendance was good, approximating 45.

Sheep and Wool Expert at Work with Group No. II.

The settlers were divided into two groups for the judging competitions; No. 1 was under the direction of Mr. Dennis, and No. 2 worked under the care of Mr. N. A. Bowman, Sheep and Wool Expert of the Department of Agriculture. After each member present had decided which sheep he considered the best, Messrs. Dennis and Bowman pointed out the sheep they would select as best in their respective classes, and explained the reasons for their selection. Messrs. Bowman and Dennis said it was their opinion that the best way to teach anybody is to get him to attempt the work himself, and it was for this reason that all present were cordially invited to participate.

Characteristics of the Polwarth.

The demonstration on Stud Polwarths, by Mr. A. W. Dennis, was of a very educational nature. It is, perhaps, worth recalling that it was

Mr. Dennis's father who first bred Polwarth sheep. Mr. Dennis went to a great deal of trouble in transporting to Ballangeich a number of his high-class ewes and rams for purposes of demonstration. "In selecting Polwarth sheep," he said, "a sound fleece-covering, as in Merinos, must be looked for, with certain modifications." He emphasized the need to consider first the carcass, and said it was essential to have a fairly level-topped sheep, with a good square stance, and good room through and across the heart, and with the room well carried out to the hind-quarters. A Polwarth should also have a moderately long leg, but the animal should not be lanky, and the ribs should be well sprung out. After having given the major consideration to the carcass, one should turn one's attention to the covering. In the fleece of a Polwarth one should look chiefly to the back; a certain lightness about the head and points might be forgiven, provided wool on the

Mr. A. W. Dennis at Work with Group No. I.

back, especially over the top of the wither, was well closed up. A good top-knot and cheek wool are desirable, but there should be no wool in front of the eyes. The belly must be thoroughly covered. Length of staple is an essential feature, together with a soft handle. A fair amount of character is wanted in the wool, but crimp must, on no account, be attained at the expense of length or softness. One should not look for the same amount of crimp in the staple as is sought in some strains of Merinos, but straight-haired sheep, especially if rather wiry in the handle, must be passed over.

The wool should not carry excessive yolk, the degree of brightness depending, in a measure, on conditions of feeding, but the Polwarth is noted for its bright, high-yielding wool.

The staple should be at least 4 inches in length for a growth of twelve months on a dry sheep. Five inches is quite common in these sheep, coupled with a quality of 58's count. The 58-count wool is

recommended, and no finer than 60's should be sought, except, perhaps, in those sheep to be mated with animals of first-cross grade, and in such a case loss of stamina must be carefully guarded against.

Hairy britches must be avoided, though often a certain amount of coarseness under the tail would have to be accepted in an otherwise desirable animal. A worse fault to be guarded against, in any breed of sheep with pretension to wool production, is the presence in the staple of a percentage of coarser fibre, which grows, more or less, all over the fleece and protrudes beyond the finer wool.

This hair-like wool is most prominent on the sheep from about two to four months after shearing. As this inferior wool cannot be separated

Judging Competition.—Members at Work.

by the wool-sorter, the whole fleece must be condemned as unsuitable for many purposes where the best wool is essential.

Post-mortem Examinations.

In speaking on Sheep Diseases, Mr. R. N. Johnstone, B.V.Sc., emphasized the absolute need, when seeking information concerning sickness or mortality amongst sheep, to furnish full details of the symptoms, &c., and to give an accurate story of the condition met with after post-mortem examination. In order to instruct the settlers in the correct way to carry out a post-mortem examination, Mr. Johnstone killed a sheep and demonstrated, in a practical manner, how post-mortem observations should be made.

CODLING MOTH CONTROL.

SPRAYING TESTS.

Report by A. A. Hammond, Senior Supervisor, Horticultural Division.

At the request of the Metropolitan Fruit Growers' Association, experiments to ascertain the value of certain sprays in codling moth control were carried out in the orchards of Messrs. T. H. Petty, of Templestowe, and W. A. Thiele, at Doncaster.

The exact objects of the tests were to ascertain the efficiency of white oil emulsion as a late spray for the control of codling moth under conditions obtaining in the southern districts, and also to test the relative efficiency of different white oil emulsions and spraying mixtures on the market.

Mr. T. H. Petty and Mr. W. A. Thiele each made available a block in their orchards wherein to make the experiments, and they also agreed to take a note daily of the temperature at dusk and the number of codling moths trapped in the lures.

The test plot in Mr. Petty's orchard was a block of nineteen-year-old Jonathan apple trees, and that in Mr. Thiele's orchard a block of old Keiffer pear trees.

Manufacturers and suppliers of white emulsifying oils and other spraying materials were invited to take part in the tests. Five of the leading firms agreed to do so.

The conditions were that the firms concerned were to supply and prepare the spraying material, and the orchardists would provide the spraying outfit and the required labour.

Those taking part in the tests were kept informed of the activities of the moth, as indicated by the lures, but the time and number of applications were left to their discretion.

The row of trees in the plot to be operated on by each firm was decided by drawing lots. The same pump and sprayer was used throughout the tests in each orchard; the pressure was from 300 to 320 to the square inch. All trees in the plots were thoroughly sprayed.

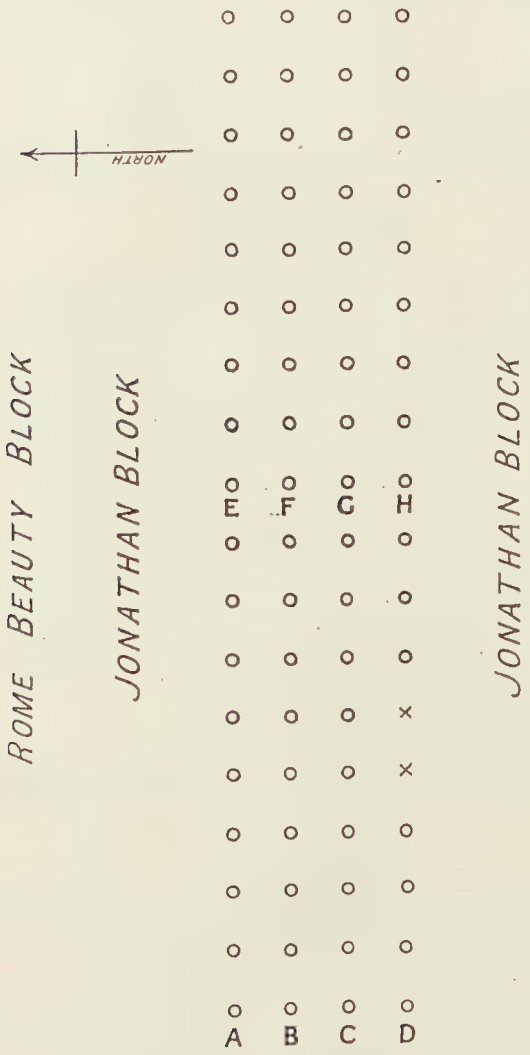
Samples of the materials were taken for analysis, and the water used was also analysed. The results of the analyses are shown in Table VII.

One lure trap was placed in each of the test plots, and as previously mentioned, the temperature and the number of moths trapped, were recorded daily.

The season was abnormal. Infestation was very light in the earlier part, but, as predicted at the time, the moth appeared very late in the season, and the infestation was unexpectedly high in the Keiffer pears in Mr. Thiele's orchard.

Results of Tests in Mr. Petty's Orchard.

There were four rows of eighteen trees each in this block. All the trees were of the Jonathan variety, except two Yates in plot D, which were eliminated from the test. The Jonathan trees were nineteen years



PLAN OF TEST BLOCK (PETTY'S ORCHARD)

X X INDICATES DEBILITATED TREES ELIMINATED FROM TEST.

old, and set a heavy crop. The block was divided into eight plots of nine trees each. Two plots each were allotted to H. C. Pannifex & Co., and the Blyth Chemicals Ltd., for the purpose of carrying out a different spraying programme in each plot.

In the case of the latter firm, however, a similar programme was carried out in both of its plots.

The Harcourt programme, which has proved so successful in the northern district during the past three years, was repeated in plot D.

The control of the moth in the whole of the plots was most effective.

CHECKING INFESTATION.

The checking of the fruit was carried out up to the time of harvesting in both test blocks by Mr. Greatorex, the District Orchard Supervisor, and the writer. During the harvesting, Mr. Jones, of the Orchard Supervision Branch, also assisted in checking the fruit.

As shown in Table II., checking began on 23rd January, and was continued at intervals, until all the fruit was picked. Infested fruit was classified as "grubs" or "stings." When the codling caterpillar had only penetrated the skin of the fruit, and had been killed, presumably by the spray, this was designated as "sting." When the caterpillar had entered the fruit, it was classified as a "grub," irrespective of its size at the time of checking.

At the time of the first check, practically no sound fruit had fallen. We checked infested fruit which had fallen, and the apples on the trees were carefully examined and all grub-infested ones picked off and checked. The so-called "stings" were left on the trees, and were checked in the final counts at harvesting.

In subsequent checks, there was a large number of windfalls, and apples which had been picked because of sunburn. In all these checks, the fruit on the trees was examined, and affected fruit picked and counted.

Harvesting began on 27th March, and was completed on 11th April.

The only fruit picked in March was from plots C and G, wherein the trees had been sprayed with Volck oil and Orthol K, respectively. These oils, particularly the former, appeared to have the effect of maturing the fruit from ten to twelve days earlier than that on the other plots.

The early development and colouring of the fruit sprayed with Volck oil was very noticeable, and this applied to fruit on all parts of the trees.

Mr. T. H. Petty, and his sons Hubert and Roy, rendered every possible assistance in carrying out the tests, and were very obliging in providing the spraying outfit at any time, no matter how urgently it might have been required elsewhere.

In Tables I. and III. the cost of 80 gallons of the spraying materials used in each plot is given. To arrive at the comparative cost, it is assumed that a similar quantity of materials was used at each application in all of the plots.

Actually, the quantity of spray applied varied with the number and size of the trees. As previously mentioned, all of the trees received an equally thorough spraying.

The total cost of each spraying programme as given would be sufficient for 40 medium-sized trees.

TABLE I.—SHOWING VARIOUS CODLING MOTH SPRAY MATERIALS USED IN EXPERIMENTS AT MR. T. H. PETTY'S ORCHARD, TEMPLESTOWE, AND THEIR COST.

Name of Firm.	Plots.	Date of Application.	Materials Used in Sprays.	Cost for 80 Gallons of Spray. £	s.	d.
		1929.				
Blyth Chemicals ..	A. & E.	Oct. 28	5 lb. "Bluebell" Arsenate Paste, 1 lb. spreader, 80 gall. water	0	4	1
		Nov. 18	,, ,, ,, ,,	0	4	1
		Dec. 19	5 lb. "Bluebell" Arsenate Paste (no spread)	0	3	4
		1930.				
		Jan. 14	5 lb. "Bluebell" Paste, 1 gall. "Bluebell" Oil, 1 lb. spreader	0	11	1
		Feb. 11	,, ,, ,, ,,	0	11	1
			Total for five sprayings ..	1	13	8
		1929.				
Jaques Pty. Ltd. ..	B.	Oct. 28	5 lb. "Elephant" Brand Arsenate Paste	0	3	4
		Nov. 18	,, ,, ,, ,,	0	3	4
		Dec. 19	,, ,, ,, ,,	0	3	4
		,, 30	1 gall. "Elephant" Brand White Oil Emulsion	0	6	0
		1930.				
		Jan. 16	5 lb. "Elephant" Brand Paste, ½ lb. spreader	0	3	11·2
		Feb. 6	5 lb. "Elephant" Brand Paste, 1 lb. spreader	0	4	1
			Total for six sprayings ..	1	4	0·2
		1929.				
H. C. Pannifex and Co.	C.	Oct. 28	2½ lb. "Ortho" Arsenate of Lead Powder, 1 lb. spreader, 80 gall. water	0	4	6·5
		Nov. 4	2½ lb. "Ortho" Lead, ⅛ gall. Volck, ½ lb. spreader, 80 gall. water	0	10	8·9
		,, 26	,, ,, ,, ,,	0	10	8·9
		Dec. 19	,, ,, ,, ,,	0	10	8·9
		1930.				
		Jan. 24	1½ gall. Volck, ½ lb. spreader ..	0	10	4·8
		Feb. 27	,, ,, ,, ,, ..	0	10	4·8
			Total for six sprayings ..	2	17	6·8

TABLE I.—*continued.*

Name of Firm.	Plots.	Date of Application.	Materials Used in Sprays.	Cost for 80 Gallons of Spray.
				£ s. d.
		1929.		
Harcourt Experiment Programme	D.	Oct. 28	5 lb. "Elephant" Brand Paste, 80 gall. water	0 3 4
		Nov. 4	,, ,, ,, ,,	0 3 4
		,, 26	2 gall. Volck, 80 gall. water ..	0 16 0
		Dec. 19	,, ,, ,, ,, ..	0 16 0
		1930.		
		Jan. 14	,, ,, ,, ,, ..	0 16 0
		Feb. 6	,, ,, ,, ,, ..	0 16 0
			Total for six sprayings ..	3 10 8
		1929.		
Wm. Cooper and Nephews Ltd.	F.	Oct. 28	2½ lb. Arsenate Powder, 80 gall. water	0 4 2
		Nov. 18	2½ lb. Arsenate Powder, 1 gall. "Alboleum," 80 gall. water	0 11 8
		Dec. 19	,, ,, ,, ,,	0 11 8
		1930.		
		Jan. 14	1 gall. "Alboleum," 80 gall. water	0 7 6
		Feb. 11	⅝ gall. "Alboleum," 80 gall. water	0 4 8·2
			Total for five sprayings ..	1 19 8·2
		1929.		
H. C. Pannifex and Co.	G.	Oct. 28	2½ lb. "Ortho" Lead, 1 lb. spreader, 80 gall. water	0 4 6·5
		Nov. 4	2½ lb. "Ortho" Lead, ⅝ gall. "Orthol K," 1 lb. spreader, 80 gall. water	0 10 11·3
		,, 26	,, ,, ,, ,,	0 10 11·3
		Dec. 19	,, ,, ,, ,,	0 10 11·3
		1930.		
		Jan. 24	1⅛ gall. "Orthol K," ⅝ lb. spreader, 80 gall. water	0 10 4·8
		Feb. 27	,, ,, ,, ,,	0 10 4·8
			Total for six sprayings ..	2 18 2
		1929.		
Victor Leggo and Farmers Ltd.	H.	Oct. 28	2½ lb. "Vallo" Arsenate Powder, 80 gall. water	0 3 6·5
		Nov. 4	,, ,, ,, ,,	0 3 6·5
		,, 26	,, ,, ,, ,,	0 3 6·5
		Dec. 19	1⅜ gall. "Vallo" Prepared White Oil, ¾ lb. spreader	0 9 11·4
		1930.		
		Jan. 14	,, ,, ,, ,,	0 9 11·4
		Feb. 6	,, ,, ,, ,,	0 9 11·4
			Total for six sprayings ..	2 0 5·7

TABLE II.—SHOWING RESULTS FROM VARIOUS CODLING MOTH CONTROL SPRAYING TESTS, IN ORCHARD OF MR. T. H. PETTY, TEMPLESTOWE.

Name of Firm and Plot.	Date of Check.	Jan. 23.	Feb. 12.	Mch. 6.	Mch. 18.	Mch. 27.	Apr. 3-4.	Apr. 10-11.	Total Infection.	Fruit. Uninfected.
A. & E. Blyth Chemicals Ltd. ..	Percentage of infection { Grubs	·19	·08	·06	·01	·02	·05	·15	·56	98·87
	{ Stings	..	..	..	..	..	·16	·41	·57	..
B. Jaques Pty. Ltd. ..	Percentage of infection { Grubs	·05	·03	·06	·01	·09	·09	·26	·56	98·62
	{ Stings	..	..	..	..	..	·18	·64	·82	
C. H. C. Pannifex and Co. ..	Percentage of infection { Grubs	·04	..	·04	·01	·47	·22	·31	1·09	98·31
	{ Stings	..	..	..	..	·14	·12	·34	·6	..
D. Harcourt Programme ..	Percentage of infection { Grubs	·04	·19	·07	·09	·18	·93	2·02	3·52	95·2
	{ Stings	..	..	..	..	..	·2	1·08	1·28	..
F. Wm. Cooper and Nephews Ltd.	Percentage of infection { Grubs	·06	·05	·10	..	·09	·28	·38	·96	98·8
	{ Stings	..	..	..	..	..	·03	·21	·24	..
G. H. C. Pannifex and Co. ..	Percentage of infection { Grubs	·03	..	·04	·03	·16	·26	·19	·71	98·87
	{ Stings	..	..	..	..	·08	·16	·18	·42	..
H. Victor Leggo and Farmers Ltd.	Percentage of infection { Grubs	·12	·14	·21	·04	·24	1·6	·48	2·83	96·44
	{ Stings	..	..	..	..	..	·39	·34	·73	..

Results of Tests in Mr. W. A. Thiele's orchard.

There were four rows of Keiffer pear trees in this block running north and south, and one running east and west, as shown in plan.

Badly debilitated trees were eliminated from the tests; these were chiefly in plot A.

The trunks of trees in the test block and adjacent blocks were all scraped, and loose bark, props, and zinc bands removed, and all hibernating caterpillars destroyed in early spring.

The spraying programmes and results are shown in Table III. The percentage of infestation at each check, and the total percentage of uninfected fruit is shown in Table IV.

When the first check was made on 17th January, plot E and plot D were remarkably free from grubs. In the former, not one infested pear could be found in seven trees, and in the fourteen trees examined in plot D, only one infested pear was found.

It should be mentioned that 99 per cent. of the first-brood caterpillars in the pears, entered the fruit through the calyx. On the other hand, the percentage of calyx infection in the apples in Mr. Petty's orchard was not more than 1 per cent. The last brood in the pears was mostly of side infection.

As calyx infection is difficult to detect in the early stages, it is quite possible that some infected fruit escaped detection, although the trees were carefully examined.

PLAN OF TEST BLOCK (THIELE'S ORCHARD)

x x INDICATES DEBILITATED TREES ELIMINATED FROM TEST.

Table III. shows that the trees in plot A received no spraying between 14th January and 21st March, and, doubtless, the comparatively heavy infestation of the fruit in this plot was largely due to this.

Mr. W. A. Thiele, like Mr. Petty, gave every assistance in carrying out the tests. His spraying outfit, and the labour required to do the spraying, were placed at the service of the Department.

As a further check on the extent of infestation in the test plots in Mr. Thiele's pear orchard, the number of codling caterpillars found under the bands on the trees in each plot during the season was recorded. The results of the check are given below:—

Plot A	.. ..	9 trees ..	13 caterpillars
„ B	.. ..	9 „ ..	66 „
„ B¹	.. ..	5 „ ..	17 „
„ C	.. ..	14 „ ..	40 „
„ D	.. ..	14 „ ..	18 „
„ E	.. ..	7 „ ..	3 „

Table III.—Showing Various Codling Moth Control Spray Materials Used in Experiments at Mr. W. A. Thiele's Orchard, Doncaster, and their Cost.

Name of Firm and Plot.	Date of Application.	Spraying Materials Used.	Water.	Cost per 80 Gallons.
				£ s. d.
	1929.			
William Cooper and Nephews Ltd.	Oct. 11	Cooper's Arsenette, 2½ lb. ..	80 gall.	0 4 2
A.	,, 30	Arsenette 2½ lb., "Alboleum," 1 gall.	,,	0 11 8
9 trees	Nov. 22	,, ,, ,, ,,	,,	0 11 8
	Dec. 19	,, ,, ,, ,,	,,	0 11 8
	1930.			
	Jan. 14	"Alboleum," 2 gall. ...	,,	0 15 0
	Mch. 21	"Alboleum," 1 gall. ..	,,	0 7 6
		Total for six sprayings ..	..	3 1 8
	1929.			
Blyth Chemicals Ltd.	Oct. 11	5 lb. "Bluebell" Arsenate Paste, 1 gall. "Bluebell" White Oil	80 gall.	0 10 4
B.	,, 30	5 lb. "Bluebell" Arsenate Paste, 1 lb. spreader	,,	0 4 1
9 trees	Nov. 22	1 gall. "Bluebell" Oil (no spreader)	,,	0 7 0
	Dec. 19	5 lb. "Bluebell" Arsenate Paste (no spreader)	,,	0 3 4
	1930.			
	Jan. 14	5 lb. "Bluebell" Arsenate Paste, 1 gall. "Bluebell" Oil, 1 lb. spreader	,,	0 11 1
	Feb. 11	,, ,, ,, ,,	,,	0 11 1
	Mch. 21	1 gall. "Bluebell" White Oil	,,	0 7 0
		Total for seven sprayings	..	2 13 11

TABLE III.—*continued.*

Name of Firm and Plot.	Date of Application.	Spraying Materials Used.	Water.	Cost per 80 Gallons. £ s. d.
	1929.			
Blyth Chemicals ..	Oct. 11	5 lb. "Bluebell" Arsenate Paste	80 gall.	0 3 4
B (1).	,, 30	5 lb. "Bluebell" Arsenate Paste, 1 lb. spreader	,,	0 4 1
5 trees	Nov. 22	5 lb. "Bluebell" Arsenate Paste (no spreader)	,,	0 3 4
	Dec. 19	,, ,, ,, ,,	,,	0 3 4
	1930.			
	Jan. 14	5 lb. "Bluebell" Arsenate Paste, 1 lb. spreader	,,	0 4 1
	Feb. 11	5 lb. "Bluebell" Arsenate Paste (no spreader)	,,	0 3 4
		Total for six sprayings ..	..	1 1 6
	1929.			
Victor Leggo and Farmers Ltd.	Oct. 11	2½ lb. "Vallo" Arsenate Powder	80 gall.	0 3 6·5
	,, 30	,, ,, ,, ,,	,,	0 3 6·5
C.	Nov. 22	,, ,, ,, ,,	,,	0 3 6.5
	Dec. 19	1⅔ gall. "Vallo" Prepared White Oil, ¾ lb. spreader	,,	0 9 11·4
14 trees	**1930.**			
	Jan. 14	,, ,, ,, ,,	,,	0 9 11·4
	Feb. 11	,, ,, ,, ,,	,,	0 9 11·4
	Mch. 21	,, ,, ,, ,,	,,	0 9 11·4
		Total for seven sprayings	..	2 10 5·1
	1929.			
H. C. Pannifex and Co.	Oct. 11	2½ lb. "Ortho" Arsenate Powder, ⅝ lb. spreader	80 gall.	0 4 2
D.	,, 30	2½ lb. "Ortho" Arsenate Powder, ⅓ gall. "Volck," 1 lb. spreader	,,	0 10 11·3
14 trees	Nov. 12	,, ,, ,, ,,	,,	0 10 11·3
	Dec. 5	,, ,, ,, ,,	,,	0 10 11·3
	,, 19	1⅓ gall. "Volck," ⅘ lb. spreader	,,	0 10 4·8
	1930.			
	Jan. 24	,, ,, ,, ,,	,,	0 10 4·8
	Feb. 27	,, ,, ,, ,,	,,	0 10 4·8
		Total for seven sprayings	..	3 6 2·3
	1929.			
Jaques Pty. Ltd. ..	Oct. 11	5 lb. "Elephant" Brand Arsenate Paste	80 gall.	0 3 4
E.	,, 30	,, ,, ,, ,,	,,	0 3 4
	Nov. 22	,, ,, ,, ,,	,,	0 3 4
7 trees	Dec. 19	,, ,, ,, ,,	,,	0 3 4
	,, 30	1 gall. "Elephant" Brand White Oil	,,	0 6 0
	1930.			
	Jan. 14	5 lb. "Elephant" Brand Arsenate Paste	,,	0 3 4
	Feb. 6	5 lb. "Elephant" Brand Arsenate, 1 lb. spreader	,,	0 4 1
	Mch. 21	1 gall. "Elephant" Brand White Oil	,,	0 6 0
		Total for eight sprayings	..	1 12 9

TABLE IV.—SHOWING RESULTS FROM VARIOUS CODLING MOTH CONTROL SPRAYING TESTS IN ORCHARD OF MR. W. A. THIELE, DONCASTER.

Name of Firm and Plot.	Dates of Check.		Jan. 17.	Feb. 6.	Mch. 6.	Mch. 18.	April 22-28.	Total Infection.	Uninfected Fruit.
A.									
Wm. Cooper and Nephews Ltd.	Infection percentages	Grubs	·14	·07	·23	·18	21·79	22·41	74·7
		Stings	..	..	..	..	2·89	2·89	..
B.									
Blyth Chemicals Ltd.	Infection percentages	Grubs	·28	·09	·85	·48	15·36	17·06	80·87
		Stings	..	..	..	..	2·07	2·07	..
B¹.									
Blyth Chemicals Ltd.	Infection percentages	Grubs	·15	·06	·31	·15	15·06	15·73	81·69
		Stings	..	..	..	..	2·58	2·58	...
C.									
Victor Leggo and Farmers Ltd.	Infection percentages	Grubs	·17	·04	·46	·33	16·31	17·31	80·15
		Stings	..	..	..	..	2·54	2·54	..
D.									
Pannifex and Co.	Infection percentages	Grubs	·008	..	·17	·14	9·94	10·25	88·79
		Stings	..	..	..	..	·96	·96	..
E.									
Jaques Pty. Ltd.	Infection percentages	Grubs	..	..	·19	·02	5·65	5·86	92·6
		Stings	..	..	..	..	1·54	1·54	..

ARSENICAL RESIDUE.

For the purpose of ascertaining the amount of residual arsenic on the fruit in the different test plots, samples of apples and pears were submitted to the Agricultural Research Chemist for analyses. The results of the analyses, together with the date of latest spraying with arsenate, the spraying cost, and the number of arsenical sprays given, are shown in Tables V. and VI.

Each sample consisted of not less than 25 fruits picked from different parts of several trees in each plot.

As was expected, the late arsenical spray was a more effective control for the late brood of moths, but the amount of residual arsenic was considerably above the permissible quantity. The maximum quantity of residual arsenic permitted is .01 grain per lb. of fruit.

TABLE V.—COMPARATIVE SPRAYING COST, ARSENICAL RESIDUE, UNINFECTED FRUIT PERCENTAGES, ETC., IN TEST BLOCKS. (EXPERIMENTS CONDUCTED IN MR. T. H. PETTY'S ORCHARD.)

Name of Firm and Plot.	Percentage Uninfected Fruit.	Spraying Cost.	Spray Residue in Grains per lb. of Fruit.			No. of Arsenical Sprays.	Date of latest Arsenical Spray.
			On Skin.	Calyx.	Total.		
A. Blyth Chemicals ..	98·87	1·02	..	..	·053	5	Feb. 11
B. Jacques Pty. Ltd.	98·62	1·0	..	..	·016	5	Feb. 6
C. Pannifex and Co.	98·31	1·4	.0038	.0031	·007	4	Dec. 19
D. Harcourt Programme	95·2	1·6	·0017	·0038	·006	2	Nov. 4
E. Blyth Chemicals..	98·87	1·02	..	..	·027	5	Feb. 11
F. Wm. Cooper and Nephews Ltd.	98·8	1·1	·0045	·0052	·010	3	Dec. 19
G. Pannifex and Co.	98·87	1·4	·0033	·0127	·016	4	Dec. 19
H. Leggo and Farmers Ltd.	96·54	1·2	..	..	·003	3	Nov. 26

TABLE VI.—COMPARATIVE SPRAYING COST, ARSENICAL RESIDUE, UNINFECTED FRUIT PERCENTAGES, ETC., IN TEST BLOCK (MR. W. A. THIELE'S ORCHARD.)

Name of Firm and Plot.	Percentage Uninfected Fruit.	Spraying Cost.	Spray Residue.	No. of Arsenical Sprayings.	Date of latest Arsenical Spray.
A. Wm. Cooper and Nephews Ltd.	74·7	1·5.	·015	4	Dec. 19
B. Blyth Chemicals.. ..	80·87	1·5	·009	5	Feb. 11
B¹. Blyth Chemicals ..	81·69	1·0	·025	6	Feb. 11
C. Leggo and Farmers Ltd. ..	80·15	1·5	·017	3	Nov. 22
D. H. C. Pannifex and Co. ..	88·79	1·7	·011	4	Dec. 5
E. Jaques Pty. Ltd. ..	92·6	1·3	·016	6	Feb. 6

Spraying Costs.

It is difficult at times to show clearly the financial gain or loss from any particular spraying programme.

In the tests under review, it is not until the whole of the facts are considered that the increased cost of the oil and oil-arsenate spray, as compared with arsenate only, is shown to be justifiable.

The advantages of a judicious programme of an oil-arsenate spray are:—

(*a*) That it is a dual-purpose spray, and controls scale insects and red spider, as well as codling moth.
(*b*) The improved appearance of the fruit, and the absence of an excess of spray residue.

The question as to whether a given programme of spraying is economically sound, when codling control only is considered, would depend on the value of the fruit and the increased percentage of clean fruit obtained with the more costly spray.

For example, if the value of the fruit is ten times the cost of the more expensive programme, a grower would show a direct profit by spending 50 per cent. more on spraying if he gained thereby an increase of 6 per cent. more clean fruit.

In Table V., the comparative cost of the different spraying programmes is shown, together with percentage of clean fruit, spray residue, and the date of last arsenical spray.

It will be seen that, in plots A and E, which were sprayed throughout the season with combined oil and arsenate, the amount of residual arsenic on the fruit was considerably above the permissible limit.

The spray residue is given as arsenic in grains per pound of fruit, as determined by the Agricultural Research Chemist.

In comparing the spraying cost, the unit of measurement is taken as 1, and the increases as percentages. The cost of labour is taken as being equal in all cases.

Reference to Tables V. and VI. will also show that the fruit containing the greatest amount of residual arsenic suffered least from late infestation.

Lures.

The use of lures in connexion with the tests proved to be very interesting, and indicated that not only are they helpful in indicating the activities of the moth, but must be of considerable importance as a direct means of control.

From 22nd October, to 13th December, 448 moths were trapped in eight lures in the test plot at Mr. Petty's orchard. Only six lures were in use up to 15th November. Of the specimens submitted to the Biologist for examination, it was determined that 75 per cent. were females. As each female lays approximately 80 eggs, a simple calculation shows that the destruction of 336 females would reduce the number

of eggs deposited by 26,880. Even allowing that only one-half of this number of eggs would be deposited, the importance of the lures is easily seen. It was determined by the Biologist that moths caught in the lures were found to contain a large number of eggs, but whether the moths examined had deposited eggs could not be determined.

Application of the sprays could be regulated by the activity of the moth, and the expense of spraying thereby reduced. This was not done to any extent in the tests under notice, owing to the abnormal weather experienced and the disinclination of those carrying out the tests to take any risks. These remarks apply particularly to the first brood of moths.

It will be seen, by reference to the trapping records, that the emergence of the first brood began about the third week in October, and continued to 13th December. After this date, very few moths were trapped to the end of January in Mr. Petty's orchard. In Mr. Thiele's orchard, comparatively few moths were trapped after 13th December, yet the late infestation of the Keiffer pears in the test was unusually severe. On the other hand, the lures indicated that the moths were active in Mr. Petty's orchard in the beginning of February. Yet there was no serious infestation of fruit after this date.

It follows from this that the lures cannot, in all circumstances, be depended on as a guide to spraying.

The only explanation that can be given as to why the lures in the Keiffer block attracted the moths early in the season, and failed to attract them when the pears were nearing maturity, is that the moth, which is guided to its host by the sense of smell, fails to recognize it, firstly, because of the oil spray; and, secondly, because at that season the aroma or scent of the lures is much stronger than that of the fruit. It would appear that, towards the ripening period, the scent of aromatic pears, such as the Keiffer, dominated that of the lures.

For the information of growers who intend using lures as an additional control measure, and which they are strongly advised to do, it may be well to give some description here of the liquid and containers which were used in the tests. The liquid was made from one part of crude molasses to sixteen parts of water, with about two tablespoonfuls of brewer's yeast to the gallon. Experiments of the molasses mixture without the yeast, however, indicate that the yeast is not required, as equally as many moths were trapped in the liquid containing no yeast.

Various kinds of containers were tried. It was found important that they have a flange around the top, such as that on a lever-top tin, as probably the moth rests on this before going into the liquid. Earthenware fern pots, which resemble the common flower pot without the opening at the bottom, were tried, and gave complete satisfaction. Whatever kind of containers are used should be hung fairly high in the trees.

The capacity of the three sizes of earthenware pots used was 2 pints, 3 pints, and 4 pints respectively. The 2-pint pot was found to be as effective as the larger ones, and is much cheaper. The interior of these

pots had to be lacquered to make them completely waterproof; wire handles were fixed to them. Half-gallon lever-top tins were also found to be effective, but they are much more expensive than the earthenware pots.

If the weather be warm, it is advisable to change the liquid weekly, but during cold weather it may be left for longer periods.

It is worthy of note that the lures made from molasses attracted only the codling moth and brown apple moth. Very rarely were any other insects trapped, and all those that were trapped were "enemies" and not "friends" of the orchardist.

Spray Blemish and Appearance of Fruit.

No serious blemish was caused to fruit on any of the test plots. The first sample of "Bluebell White" oil that was used on the Keiffer pears in the first spraying just after the fruit had set, caused slight burning of the foliage, but the damage done was not appreciable. The sample used later on this same plot, and on the apple plot, did not cause any noticeable damage. The fruit on trees in plot D in Mr. Petty's orchard, which were sprayed with Volck oil (1 in 40), showed a slight burning or discolouration, particularly near the calyx. The first oil spray in this block also caused a rather heavy drop of the young fruit. After the drop, however, the trees still carried a heavy crop, as was the case with all trees in the test block. The appearance of the fruit was not altogether satisfactory, and this was accentuated by the dust adhering to what was apparently residual oil on the apples. This was particularly noticeable on the fruit borne by the trees near the road.

The apples, however, sprayed with Volck combined with arsenate at a strength of 1 gallon to 100 gallons of water, and later with 1½ to 100 without arsenate, were outstanding. The fruit matured ten to twelve days before the fruit on other plots, and the skin was brighter, cleaner, and more highly coloured. The fruit on plot G sprayed with Orthol "K," also matured earlier, but it was not so bright in appearance as the fruit sprayed with Volck.

The pears sprayed with Volck were also notably better in appearance than those treated with other oils, but the difference was not so marked as with the apples.

One advantage of the oil sprays generally, when used as a substitute for arsenate in late spraying, is the absence of perceptible residue on the fruit when harvesting. This condition, of course, does away with the necessity of wiping the fruit.

SUMMARY.

It is generally recognized that one season's test is insufficient to arrive at a definite conclusion respecting the relative efficiency of the different

spraying mixtures and programmes of spraying. Last season's tests suggest that arsenical calyx sprays, followed by oil only, do not give an effective control in the southern district.

The indications are that an arsenical calyx spray, followed by the oil-arsenate combination to control the first brood of moths, which in the season just passed extended from late October to mid-December, is an efficient control. This spray has the further advantage of being a dual purpose spray.

Provided that there is no re-infestation from a neighbouring block or orchard, the control of the late broods in a normal season would be comparatively easy if arsenate combined with a good white oil were used to control the first brood.

In Mr. Petty's orchard there was very little trouble from the late brood. This probably was because there were later apples in adjoining blocks. On the other hand, when the fruit was harvested in early March from the block of Howell pears adjoining the test block in Mr. Thiele's orchard, the moths were attracted from the Howell block to the Keiffer's in the test block.

The Howell pear block, as well as the rest of the orchard generally, was well sprayed and cared for, but the eggs of the small percentage of moths that escaped destruction and concentrated on the block were sufficient to cause a serious infestation. As shown in Table IV., there was very little infestation until after the middle of March.

Referring again to Tables III. and IV., it will be seen that plots B and B (1) in Thiele's orchard are the only plots which can be compared as to the relative efficiency of the oil and arsenate sprays and the arsenate spray only.

Plot B (1) was sprayed throughout with "Bluebell" arsenate of lead; in plot B, the arsenate oil combination was used.

The spraying cost of B (1) was only two-thirds of that of B, and a higher percentage of clean fruit was obtained in the former.

Plot E, where "Elephant" brand arsenate only was used till 30th December, gave the highest percentage of clean fruit.

The Volck oil-arsenate combination proved an efficient control of the first brood, the difference in favour of Plot E being negligible.

Volck oil, it would seem, repelled the moth or prevented it from recognizing its hosts, as it was noticeable that fewer eggs were deposited on the fruit which had been sprayed with this oil.

The use of lures is undoubtedly an important factor in control, and should be generally practised.

Orchard hygiene, such as attending to bandages, and the collection of infected fruit, is an important factor in control, and should be practised, particularly for the destruction of the caterpillars of the first brood.

TABLE VII.—RESULTS OF ANALYSES OF SAMPLES OF SPRAYING MATERIALS USED IN CODLING MOTH CONTROL TESTS.

Name of Firm.	Material.	Moisture.	Total Arsenic Pentoxide as 205 Dry Basis.	Water Soluble Arsenic Pentoxide as 205 Dry Basis.	Material.	Moisture.	Oil by Weight.	Alkalinity as Sodium-Hydroxide.
Blyth Chemicals ..	"Bluebell" Arsenate of Lead (Paste)	48·46%	32·78%	0·37%	"Bluebell" White Oil Emulsion—			
					No 1 Sample ..	22·1%	77·5%	1·0%
					No. 2 Sample ..	26·6%	73·2%	0·14%
Jaques Pty. Ltd. ..	"Elephant" Brand Arsenate of Lead (Paste)	50·01%	33·06%	0·49%	"Elephant" White Oil Emulsion	20·4%	79·1%	0·32%
Wm. Cooper and Nephews Ltd. ..	Cooper's Arsinette (Powder)	0·76%	31·19%	0·52%	Cooper's "Alboleum" (White Emulsifying) Oil	26·7%	72·9%	0·4%
Victor Leggo and Co...	"Vallo" Arsenate (Powder)	0·44%	32·20%	0·41%	"Vallo" Prepared White Spraying Oil	7·4%	92·4%	0·11%
H. C. Pannifex and Co.	"Ortho" Arsenate (Powder)	0·19%	31·91%	0·89%	"Volck" White Oil ..	20·2%	79·2%	0·3%
					"Orthol K" White Oil	21·9%	77·65%	0·23%

Results of Trapping showing Codling Moth Activity.

MR. W. A. THIELE'S ORCHARD, DONCASTER.

Temperature at Dusk.	Date.	Pot 1.	Pot 2.	Pot 3.	Pot 4.	Pot 5.	Pot 6.
	1929–30.						
	Oct. 15 ..	..	..	..	..	..	..
	,, 16 ..	..	..	..	..	..	..
57	,, 17 ..	1	..	..	1	2	..
58	,, 18 ..	1	..	..	..	1	..
54	,, 19 ..	..	..	..	..	..	..
56	,, 20 ..	..	..	..	..	..	..
57	,, 21 ..	..	..	..	..	..	..
56	,, 22 ..	..	..	1	..	..	1
54	,, 23 ..	..	..	..	..	..	..
61	,, 24 ..	..	1	..	5	5	2
61	,, 25 ..	..	1	1	..	1	..
51	,, 26 ..	..	..	..	..	..	..
59	,, 27 ..	..	2	1	1	1	1
	,, 28 ..	..	..	..	..	..	..
55	,, 29 ..	..	..	..	..	..	..
55	,, 30 ..	..	1	..	..	..	2
52	,, 31 ..	..	..	..	..	..	..
60	Nov. 1 ..	..	1	..	..	2	5
79	,, 2 ..	7	4	5	5	6	12
58	,, 3 ..	1	1	1	..	..	..
C.A. 51	,, 4 ..	..	..	..	..	..	..
	,, 5 ..	..	..	..	..	..	..
52	,, 6 ..	..	..	1	..	..	..
54	,, 7 ..	..	..	1	..	..	..
60	,, 8 ..	..	..	..	..	1	..
66	,, 9 ..	5	3	3	1	1	4
60	,, 10 ..	4	..	4	..	1	1
61	,, 11 ..	1	..	..	..	..	..
60	,, 12 ..	4	1	1	3	..	2
60	,, 13 ..	..	..	..	1	..	1
54	,, 14 ..	..	..	..	..	..	..
50	,, 15 ..	1	..	..	..	4	..
58	,, 16 ..	2	..	2	1	3	1
68	,, 17 ..	2	5	2	2	6	10
	,, 18 ..	1	3	2	..	1	2
60	,, 19 ..	4	4	2	4	4	3
62	,, 20 ..	3	3	3	4	9	5
63	,, 21 ..	6	1	7	2	7	2
58	,, 22 ..	..	..	1	..	..	..
70	,, 23 ..	..	2	5	3	13	8
65	,, 24 ..	1	..	2	1	1	4
	,, 25 ..	..	..	4	..	2	..
54	,, 26 ..	..	..	..	..	..	..
54	,, 27 ..	..	..	..	1	..	..
76	,, 28 ..	5	..	..	..	3	1
58	,, 29 ..	..	..	1	1	..	..
60	,, 30 ..	3	2	1	1	..	2
58	Dec. 1 ..	2	..	1	2	1	4
75	,, 2 ..	9	..	..	1	2	4
	,, 3 ..	..	..	..	..	..	..
50	,, 4 ..	..	..	..	..	..	..
52	,, 5 ..	1	1	..	..	..	..
53	,, 6 ..	1	..	..	1	..	1
51	,, 7 ..	..	..	..	..	..	..
76	,, 8 ..	5	3	1	2	1	1
86	,, 9 ..	1	2	2	..	4	..

RESULTS OF TRAPPING (MR. W. A. THIELE'S ORCHARD)—*continued.*

Temperature at Dusk.	Date.	Pot 1.	Pot 2.	Pot 3.	Pot 4.	Pot 5.	Pot 6.
	1929–30						
	Dec. 10 ..	..	..	..	..	..	..
68	,, 11 ..	1	..	1	..	..	4
65	,, 12 ..	2	1	2	1	1	2
60	,, 13 ..	..	1	2	..	..	1
63	,, 14 ..	..	2	..	..	3	..
	,, 15 ..	..	..	..	..	..	..
53	,, 16 ..	..	..	..	..	..	..
50	,, 17 ..	..	..	..	..	..	..
54	,, 18 ..	..	1	..	1	1	..
55	,, 19 ..	..	..	1	..	..	1
68	,, 20 ..	..	..	..	2	..	..
	,, 21 ..	..	..	..	..	..	..
68	,, 22 ..	..	..	..	..	..	..
68	,, 23 ..	..	3	2	..	1	1
55	,, 24 ..	..	..	..	..	..	..
70	,, 25 ..	..	..	..	..	..	1
	,, 26 ..	..	..	..	..	..	..
65	,, 27 ..	..	..	1	2	1	4
	,, 28 ..	..	..	..	..	..	..
63	,, 29 ..	1	..	1	..	..	..
58	,, 30 ..	..	..	..	..	..	..
60	,, 31 ..	..	..	..	..	..	..
64	Jan. 1 ..	..	..	..	..	..	..
60	,, 2 ..	..	..	..	..	..	..
59	,, 3 ..	..	..	..	..	..	..
	,, 4 ..	..	..	..	..	..	..
60	,, 5 ..	..	..	..	..	..	..
72	,, 6 ..	1	1	2	2	2	2
75	,, 7 ..	1	..	..	..	2	1
74	,, 8 ..	..	..	..	..	..	..
80	,, 9 ..	..	..	..	..	..	..
78	,, 10 ..	..	2	..	..	..	..
58	,, 11 ..	1	..	..	..	..	..
65	,, 12 ..	..	..	..	..	..	..
80	,, 13 ..	..	..	..	..	..	..
65	,, 14 ..	..	..	..	..	..	..
66	,, 15 ..	..	..	..	..	..	..
	,, 16 ..	..	..	..	..	..	..
	,, 17 ..	..	..	..	..	..	..
	,, 18 ..	1	..	..	..	1	..
	,, 19 ..	..	..	..	..	..	..
	,, 20 ..	..	..	..	..	..	..
	,, 21 ..	..	..	..	..	..	..
	,, 22 ..	1	..	..	..	..	..
	,, 23 ..	..	..	..	..	..	..
	,, 24 ..	..	..	..	..	..	..
	,, 25 ..	..	..	..	..	..	..
	,, 26 ..	..	..	..	..	..	..
	,, 27 ..	..	..	..	..	..	..
70	,, 28 ..	..	..	..	..	3	2
70	,, 29 ..	..	..	..	..	..	..
	,, 30 ..	..	..	..	..	..	..
	,, 31 ..	..	..	..	..	..	..
	Feb. 1 ..	..	..	..	..	..	..
	,, 2 ..	..	..	..	..	..	..
85	,, 3 ..	..	..	..	..	..	2
86	,, 4 ..	..	..	..	..	..	..
	,, 5 ..	..	..	..	..	..	..

RESULTS OF TRAPPING (MR. W. A. THIELE'S ORCHARD)—*continued.*

Temperature at Dusk.	Date.	Pot 1.	Pot 2.	Pot 3.	Pot 4.	Pot 5.	Pot 6.
	1929–30.						
95	Feb. 6 ..	..	..	..	..	..	..
70	,, 7 ..	..	..	..	..	..	..
	,, 8 ..	..	..	..	..	..	..
	,, 9 ..	..	..	..	..	..	..
85	,, 10 ..	..	..	..	..	..	..
89	,, 11 ..	..	..	1	..	..	1
	,, 12 ..	..	..	..	..	..	..
	,, 13 ..	..	..	..	..	..	..
	,, 14 ..	..	..	..	..	..	..
	,, 15 ..	..	..	..	..	..	..
70	,, 16 ..	1	1	3	..	..	..
70	,, 17 ..	..	..	..	..	..	..
	,, 18 ..	..	..	..	..	..	..
	,, 19 ..	..	..	..	..	..	..
	,, 20 ..	..	..	..	..	..	..
	,, 21 ..	..	..	..	..	..	..
	,, 22 ..	..	..	..	..	..	..
	,, 23 ..	..	..	..	..	..	..
	,, 24 ..	..	..	..	..	..	..
	,, 25 ..	..	..	..	..	..	..
	,, 26 ..	..	..	..	..	..	..
	,, 27 ..	..	..	..	..	..	..

Total 454 in 6 lures.

MR. PETTY'S ORCHARD, TEMPLESTOWE.

Temperature at Dusk.	Date.	Pot 1.	Pot 2.	Pot 3.	Pot 4.	Pot 5.	Pot 6.	Pot 7.	Pot 8.
	1929–30.								
	Oct. 15 ..	..	..	..	..	..	..	..	..
	,, 16 ..	..	..	..	..	..	..	..	..
	,, 17 ..	..	..	..	..	..	..	..	..
	,, 18 ..	..	..	..	..	..	..	..	..
	,, 19 ..	..	..	..	..	..	..	..	..
57	,, 20 ..	..	..	..	..	..	..	..	..
58	,, 21 ..	..	..	..	..	..	..	..	..
54	,, 22 ..	..	..	..	..	1	1	..	..
55	,, 23 ..	..	..	..	..	..	..	..	..
54	,, 24 ..	..	..	..	..	8	..	..	..
57	,, 25 ..	..	..	..	..	..	..	..	..
58	,, 26 ..	1	..	..	1	..	..	..	..
59	,, 27 ..	..	..	..	..	..	..	..	..
52	,, 28 ..	3	2	..	1	2	2	..	..
50	,, 29 ..	..	..	..	..	..	..	..	..
51	,, 30 ..	..	..	..	..	..	..	..	..
50	,, 31 ..	1	..	1	..	..	2	..	..
52	Nov. 1 ..	1	3	2	1	5	3	..	..
75	,, 2 ..	16	10	10	9	4	12	..	..
55	,, 3 ..	1	4	2	4	8	1	..	..
50	,, 4 ..	2	1	3	..	1	2	..	..
52	,, 5 ..	..	..	..	..	..	..	..	..
50	,, 6 ..	1	..	..	1	..	..	..	..

RESULTS OF TRAPPING (MR. PETTY'S ORCHARD)—*continued.*

Temperature at Dusk.	Date.	Pot 1.	Pot 2.	Pot 3.	Pot 4.	Pot 5.	Pot 6.	Pot 7.	Pot 8.
	1929–30.								
56	Nov. 7 ..	2	1	2	2	3	..	..	..
60	,, 8 ..	1	..	1	2	1	1	..	..
60	,, 9 ..	1	8	5	6	5	6	..	..
58	,, 10 ..	1	3	1	2	2	1	..	..
60	,, 11 ..	..	1	1	..	..	3	..	..
52	,, 12 ..	..	..	..	..	..	..	..	..
51	,, 13 ..	..	..	..	..	..	..	..	..
50	,, 14 ..	1	..	1	2	..	..	..	..
52	,, 15 ..	2	2	3	1	..	2	1	2
65	,, 16 ..	6	1	7	7	3	5	..	5
55	,, 17 ..	..	2	1	1	2	2	..	2
56	,, 18 ..	1	..	2	1	..	..	..	..
51	,, 19 ..	..	..	..	..	..	..	..	..
50	,, 20 ..	..	2	1	..	1	1	1	1
60	,, 21 ..	..	..	..	..	..	..	..	..
70	,, 22 ..	2	1	2	2	3	..	..	..
54	,, 23 ..	1	4	2	4	8	1	..	..
55	,, 24 ..	1	..	2	..	3	1	..	..
50	,, 25 ..	..	..	..	..	..	..	..	2
53	,, 26 ..	..	..	..	..	..	..	..	..
60	,, 27 ..	..	1	..	1	..	..	..	1
52	,, 28 ..	..	..	1	..	1	1	..	..
50	,, 29 ..	1	1	1	..	..	2	..	..
50	,, 30 ..	..	..	..	..	..	..	..	..
68	Dec. 1 ..	2	..	2	..	3	2	1	..
55	,, 2 ..	1	..	..	1	1	..	..	1
52	,, 3 ..	1	4	2	1	1	2	2	2
54	,, 4 ..	..	..	..	..	..	..	..	..
55	,, 5 ..	1	..	..	1	..	3	..	3
58	,, 6 ..	..	..	..	1	..	..	..	..
60	,, 7 ..	1	3	2	1	1	2	1	1
80	,, 8 ..	2	4	3	4	6	3	3	4
62	,, 9 ..	2	2	1	..	..	1	..	..
60	,, 10 ..	1	..	..	1	..	..	1	..
65	,, 11 ..	..	1	..	..	1	..	..	..
70	,, 12 ..	1	..	1	1	..	1	..	1
72	,, 13 ..	3	4	5	6	3	4	4	8
62	,, 14 ..	..	..	..	..	..	..	..	..
50	,, 15 ..	..	..	..	..	..	..	..	..
52	,, 16 ..	..	..	..	..	..	..	..	..
55	,, 17 ..	..	..	..	..	..	..	..	..
50	,, 18 ..	..	..	..	..	..	..	..	..
50	,, 19 ..	..	..	..	..	..	..	..	..
54	,, 20 ..	1	1	..	..	..	1	..	..
50	,, 21 ..	..	..	..	..	..	..	..	..
60	,, 22 ..	..	..	..	..	..	..	..	..
70	,, 23 ..	..	..	..	..	..	..	..	..
65	,, 24 ..	1	..	..	..	1	..	..	..
	,, 25 ..	..	..	..	..	..	..	..	..
	,, 26 ..	..	..	..	..	..	..	..	..
	,, 27 ..	..	..	..	..	..	..	..	..
57	,, 28 ..	..	..	..	..	..	..	..	..
51	,, 29 ..	..	..	..	2	3	2	..	..
54	,, 30 ..	..	..	..	..	1	..	..	..
55	,, 31 ..	..	..	..	..	..	..	..	..
58	Jan. 1 ..	..	..	1	..	..	..	..	..
58	,, 2 ..	..	..	..	1	..	..	..	..
59	,, 3 ..	..	..	..	2	..	..	..	..

RESULTS OF TRAPPING (MR. PETTY'S ORCHARD)—*continued.*

Temperature at Dusk.	Date.	Pot 1.	Pot 2.	Pot 3.	Pot 4.	Pot 5.	Pot 6.	Pot 7.	Pot 8.
	1929–30.								
57	Jan. 4 ..	..	..	..	..	..	..	..	..
74	,, 5 ..	..	..	..	..	..	..	..	..
76	,, 6 ..	..	..	..	..	..	..	..	..
70	,, 7 ..	..	..	..	..	..	..	..	..
83	,, 8 ..	..	..	..	..	..	..	..	..
80	,, 9 ..	..	1	..	..	..	1	..	..
57	,, 10 ..	1	1	..	..	..	..	..	..
60	,, 11 ..	..	..	..	..	..	..	..	..
61	,, 12 ..	..	1	..	..	..	..	..	..
60	,, 13 ..	..	..	..	..	..	..	..	..
60	,, 14 ..	..	..	..	..	..	..	..	..
58	,, 15 ..	..	..	..	..	..	..	..	..
52	,, 16 ..	..	..	..	..	..	..	..	..
70	,, 17 ..	..	..	..	..	..	..	..	..
60	,, 18 ..	..	1	..	1	..	2	1	1
62	,, 19 ..	..	..	..	..	..	..	..	..
61	,, 20 ..	..	..	..	..	..	..	..	..
65	,, 21 ..	..	..	..	..	..	..	..	..
70	,, 22 ..	..	..	..	..	..	..	..	..
60	,, 23 ..	..	..	..	..	..	..	..	..
58	,, 24 ..	..	..	..	..	..	..	..	..
57	,, 25 ..	..	..	..	..	..	..	..	..
58	,, 26 ..	..	..	..	..	1	..	..	..
56	,, 27 ..	..	..	..	..	..	..	..	..
57	,, 28 ..	..	..	..	..	..	..	..	..
60	,, 29 ..	1	..	..	..	4	..	2	2
62	,, 30 ..	1	..	..	..	..	..	..	..
66	,, 31 ..	..	..	1	1	..	..	..	1
75	Feb. 1 ..	3	2	..	1	2	2	3	1
84	,, 2 ..	7	4	2	8	6	7	7	4
70	,, 3 ..	3	2	1	1	4	3	2	2
71	,, 4 ..	..	..	..	..	..	..	..	..
90	,, 5 ..	..	..	..	..	..	..	..	..
	,, 6 ..	4	..	6	..	2	7	2	1
60	,, 7 ..	..	..	..	..	..	..	..	..
71	,, 8 ..	..	..	..	..	..	..	..	..
88	,, 9 ..	..	..	..	..	..	..	..	..
72	,, 10 ..	..	..	..	..	..	..	..	..
64	,, 11 ..	2	2	1	1	1	1	..	4
	,, 12 ..	..	..	..	..	..	..	..	..
	,, 13 ..	..	..	..	..	..	..	..	..
70	,, 14 ..	1	1	5	3	1	1	1	4
68	,, 15 ..	1	..	..	..	1	..	..	2
69	,, 16 ..	..	..	..	..	..	..	..	..
	,, 17 ..	..	..	..	..	..	..	..	..
	,, 18 ..	..	..	..	..	..	..	..	..
	,, 19 ..	..	..	..	..	..	..	..	..
	,, 20 ..	..	..	..	..	..	..	..	..
	,, 21 ..	..	..	..	..	..	..	..	..
	,, 22 ..	..	..	..	..	..	..	..	..
	,, 23 ..	..	..	..	..	..	..	..	..
	,, 24 ..	..	..	..	..	..	..	..	..
	,, 25 ..	..	..	..	..	..	..	..	..
	,, 26 ..	2	1	..	1	2	2	..	..
	,, 27 ..	..	..	..	..	..	..	..	..

630 moths trapped in 8 lures

BURNLEY EGG-LAYING COMPETITION.

(Commenced 1st April, 1929, to 2nd March, 1930.)

DETAILS OF FINAL RESULTS.

Certificates were awarded for the greatest number of first-grade eggs laid, provided that in Classes 1, 2, and 4 of Section A a team of six birds laid not less than 1,200 first-grade eggs and in Classes 3 and 5 not less than 1,000 first-grade eggs. In Classes 1, 2, and 4 of Section B certificates were awarded to owners of birds that laid not less than 240 first-grade eggs, and in Classes 3 and 5 not less than 220 first-grade eggs. No certificate was awarded to individuals in any class of Section A that laid less than 220 first-grade eggs. During the first two months of the competition a first-grade egg must have weighed not less than $1\frac{3}{4}$ oz. and thereafter not less than 2 oz.

x Denotes eggs laid outside the nest.

Following are the colours of the identification rings :—No. 1, a red ring ; No. 2, white No. 3, blue ; No. 4, yellow ; No. 5, green ; No. 6, brown.

Section A.—Groups of Six Birds—Trapnested.

Class 1.—White Leghorns, Wet Mash.

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
1	1st Prize, Champion Certificate, also Trophy, valued £2— Anstis Bros., Hill View Poultry Farm, Spring Vale	1	236	3	233
		2	228	36	192
		3	199	11	188
		4	195	71	124
		5	263	5	258
		6	252	19	233
		x	4	4	..
		..	1,377	149	1,228
25	Miss L. M. Roberts, "Urana," Pascoe Vale-road, Pascoe Vale, W.8	1	190	2	188
		2	252	..	252
		3	198	1	197
		4	205	..	205
		5	201	34	167
		6	196	16	180
		x	..	..	..
		..	1,242	53	1,189
6	A. Cathcart, Charles-street, Burwood, E.13 ..	1	190	1	189
		2	215	82	133
		3	193	13	180
		4	253	3	250
		5	225	..	225
		6	201	3	198
		x	..	..	..
		..	1,277	102	1,175
10	T. L. Eastaugh, Nepean-road, Highett, S.21 ..	1	190	..	190
		2	185	1	184
		3	254	17	237
		4	226	70	156
		5	212	9	203
		6	209	10	199
		x	..	..	..
		..	1,276	107	1,169

Section A—*continued.*

Class 1.—White Leghorns, Wet Mash—*continued.*

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
26	"Ruburina" (V. D. Wallington), Nell-street, Greensborough	1	154	..	154
		2	196	4	192
		3	180	11	169
		4	227	14	213
		5	183	13	170
		6	257	19	238
		x	4	..	4
		..	1,201	61	1,140
2	W. H. Bamford, 74 Anzac Highway, Glenelg, South Australia	1	192	21	171
		2	192	7	185
		3	254	89	165
		4	226	11	215
		5	196	6	190
		6	208	6	202
		x	..	..	..
		..	1,268	140	1,128
11	W. H. Ellis, 23 Albert-crescent, Surrey Hills, E.10	1	216	..	216
		2	222	3	219
		*3	176	14	162
		4	139	4	135
		5	221	26	195
		6	204	17	187
		x	1	1	..
		..	1,179	65	1,114
33	N. H. Ramsden, "Linden," Weatherall-road, Cheltenham, S.22	1	221	1	220
		2	190	16	174
		3	154	3	151
		4	213	2	211
		5	193	1	192
		6	133	1	132
		x	..	..	..
		..	1,104	24	1,080
32	H. Schmutter, Bunyip	1	198	1	197
		2	150	60	90
		3	187	39	148
		4	206	..	206
		5	217	12	205
		6	231	34	197
		x	2	..	2
		..	1,191	146	1,045
15	A. J. Hill, Sunraysia Poultry Farm, Greensborough	1	178	2	176
		2	237	6	231
		3	162	..	162
		4	199	..	199
		5	21	..	21
		6	250	..	250
		x	5	..	5
		..	1,052	8	1,044
5	P. G. Caldwell, Riversdale-road (Gate House), Camberwell, E.6	1	192	19	173
		2	173	19	154
		3	205	2	203
		4	204	1	203
		5	186	..	186
		6	115	..	115
		x	4	3	1
		..	1,079	44	1,035

* Died 17.2.30.

Section A—*continued.*

Class 1.—White Leghorns, Wet Mash—*continued.*

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
17	Kadima Poultry Farm (I. Soafkin), Dandenong-road, Cheltenham, S.22	1	123	..	123
		2	133	1	132
		3	196	..	196
		4	197	..	197
		5	229	22	207
		6	178	..	178
		x	1	..	1
		..	1,057	23	1,034
23	G. Pocknall, 138 Dundas-street, Thornbury, N.17 ..	1	239	97	142
		2	237	26	211
		3	228	7	221
		4	257	11	246
		5	235	120	115
		6	226	135	91
		x	4	3	1
		..	1,426	399	1,027
14	F. R. De Garis, Hilfred Poultry Farm, Holloway-road, Sandringham, S.8	1	230	3	227
		2	211	94	117
		3	195	14	181
		4	215	168	47
		5	247	3	244
		6	196	5	191
		x	1	1	..
		..	1,295	288	1,007
7	P. E. Cook, Springvale-road, Glen Waverley ..	1	190	105	85
		2	184	1	183
		3	188	6	182
		4	213	..	213
		5	212	1	211
		6	163	38	125
		x	..	..	..
		..	1,150	151	999
18	M. G. Leech, Trevallyn Poultry Farm, Sydney-road, Campbellfield	1	219	2	217
		2	188	1	187
		3	166	7	159
		4	214	65	149
		5	201	25	176
		6	124	34	90
		x	3	1	2
		..	1,115	135	980
19	Morton Bros., Deep Creek-road, Mitcham	1	247	179	68
		2	164	20	144
		3	171	11	160
		4	231	10	221
		5	221	3	218
		6	168	1	167
		x	..	..	..
		..	1,202	224	978
30	Spero Stud Poultry Farm (L. P. Branagan), Moorabbin-road, Cheltenham, S.22	1	182	14	168
		2	239	30	209
		3	192	11	181
		4	184	107	77
		5	221	32	189
		6	174	30	144
		x	5	1	4
		..	1,197	225	972

Section A—*continued.*

Class 1.—White Leghorns, Wet Mash—*continued.*

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
29	F. M. G. Starbuck, Murray River Poultry Farm, Murrabit	1	183	..	183
		2	143	..	143
		3	183	..	183
		4	175	..	175
		5	144	8	136
		6	146	..	146
		x	3	..	3
		..	977	8	969
24	Rosette Poultry Farm (C. J. Ratz), Burwood and Dobson roads, Lower Fern Tree Gully	1	237	22	215
		2	176	81	95
		3	195	18	177
		4	189	2	187
		5	155	11	144
		6	162	24	138
		x	1	1	..
		..	1,115	159	956
28	A. Smith, 90 Toorak-road, South Hawthorn, E.3 ..	1	190	..	190
		2	182	16	166
		3	215	92	123
		4	214	2	212
		5	188	8	180
		6	189	128	61
		x	8	7	1
		..	1,186	253	933
27	A. Siede and Sons, Highett Poultry Farm, Point Nepean-road, Highett, S.21	*1	..	..	..
		2	205	18	187
		3	232	12	220
		4	242	17	225
		5	195	22	173
		6	203	90	113
		x	6	5	1
		..	1,083	164	919
20	Overport Poultry Farm (T. R. Ashworth), Overport-road, Frankston	1	156	22	134
		2	249	..	249
		3	197	94	103
		4	198	7	191
		5	117	17	100
		6	153	37	116
		x	1	1	..
		..	1,071	178	893
21	O. Pearse, "Etker," Box 33, Donald	1	213	75	138
		2	224	30	194
		†3	135	45	90
		4	187	22	165
		5	157	40	117
		6	193	7	186
		x	..	..	..
		..	1,109	219	890
3	B. W. Craddock, Suffolk-road, Sunshine, W.20 ..	1	154	4	150
		2	251	190	61
		3	196	6	190
		4	222	23	199
		5	191	42	149
		6	147	15	132
		x	2	2	..
		..	1,163	282	881

* Died 24.6.29. † Died 27.2.30.

Section A—*continued.*

Class 1.—White Leghorns, Wet Mash—*continued.*

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
16	R. A. Johnson, Lilydale Poultry Farm, Werribee ..	1	223	7	216
		2	164	3	161
		3	205	122	83
		4	229	..	229
		5	210	67	143
		6	30	2	28
		x	2	1	1
		..	1,063	202	861
31	G. J. White, Allwell Stud Poultry Farm, Glen Waverley	1	178	60	118
		2	192	18	174
		3	156	2	154
		4	130	10	120
		5	172	10	162
		6	208	95	113
		x	1	..	1
		..	1,037	195	842
9	M. Deacon, Grandview-grove, Rosanna	1	245	105	140
		2	106	57	49
		3	219	1	218
		4	205	...	205
		5	132	78	54
		6	164	..	164
		x	..	..	..
		..	1,071	241	830
13	Glen Athol Orchard and Poultry Farm (Genat and Murray Pty. Ltd.), Loader-road, Mooroodue	1	101	..	101
		2	99	18	81
		3	145	3	142
		4	145	2	143
		5	105	1	104
		6	185	..	185
		x	..	..	..
		..	780	24	756
4	Rockbank Poultry Farm (A. Cornish), Rockbank ..	1	57	35	22
		2	220	4	216
		3	186	152	34
		4	156	23	133
		5	200	7	193
		6	158	14	144
		x	4	..	4
		..	981	235	746
8	H. W. Devlin, 100 Dendy-street, Middle Brighton, S.5	1	235	1	234
		2	205	114	91
		3	210	117	93
		4	92	11	81
		5	185	32	153
		6	145	76	69
		x	1	..	1
		..	1,073	351	722
12	G. Fraser, "Carrum," Thorpdale	1	87	5	82
		2	227	3	224
		*3	1	..	1
		4	129	60	69
		†5	120	58	62
		6	211	6	205
		x	..	..	..
		..	775	132	643

* Died 14.8.29. † Died 3.11.29.

Section A—*continued.*

Class 1.—White Leghorns, Wet Mash—*continued.*

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
22	C. J. Phillips, King Edward-avenue, Sunshine, W.20	1	175	1	174
		2	13	..	13
		3	165	39	126
		4	179	24	155
		5	79	4	75
		6	87	3	84
		x	2	..	2
		..	700	71	629

Class 2.—White Leghorns, Dry Mash.

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
36	1st Prize, Champion Certificate—N. Burston, Bulleen-road, Balwyn, E.9	1	199	9	190
		2	204	2	202
		3	225	9	216
		4	227	25	202
		5	202	4	198
		6	204	6	198
		x	1	..	1
		..	1,262	55	1,207
39	A. J. Hill, Sunraysia Poultry Farm, Greensborough ..	1	177	..	177
		2	206	30	176
		3	182	1	181
		4	237	1	236
		5	217	..	217
		6	187	17	170
		x	..	..	..
		..	1,206	49	1,157
34	Argyle Poultry Farm (W. A. Wheatland), Point Nepean-road, Seaford	1	161	2	159
		2	195	13	182
		3	180	1	179
		4	233	69	164
		5	204	1	203
		6	227	12	215
		x	1	1	..
		..	1,201	99	1,102
35	W. H. Bamford, 74 Anzac Highway, Glenelg, South Australia	1	188	13	175
		2	190	28	162
		3	196	25	171
		4	228	10	218
		5	207	6	201
		6	179	8	171
		x	1	1	..
		..	1,189	91	1,098
38	A. Enticknap, 38 Serrell-street, East Malvern, S.E.5	1	180	4	176
		2	165	48	117
		3	159	19	140
		4	199	13	186
		5	192	2	190
		6	233	8	225
		x	..	..	..
		..	1,128	94	1,034

Section A—*continued.*

Class 2.—White Leghorns, Dry Mash—*continued.*

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
41	"Ruburina" (V. D. Wallington), Nell-street, Greensborough	1	217	7	210
		2	222	30	192
		3	171	3	168
		4	98	7	91
		5	185	4	181
		6	178	21	157
		x	4	2	2
		..	1,075	74	1,001
37	S. G. Davis, "Warneton," Embankment-grove, Chelsea	1	156	26	130
		2	167	77	90
		3	182	..	182
		4	214	58	156
		5	180	27	153
		6	155	1	154
		x	1	..	1
		..	1,055	189	866
40	Mrs. M. V. McPhee, Warrien-road, Croydon	1	108	3	105
		2	154	30	124
		3	115	2	113
		4	129	3	126
		5	146	5	141
		*6	4	..	4
		x	..	..	..
		..	656	43	613

* Died 12.5.29.

Class 3.—All Light Breeds, other than White Leghorns, Wet Mash.

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
43	1st Prize, Champion Certificate—J. B. Salmond, Deer Park (Black Leghorns)	1	182	18	164
		2	124	1	123
		3	158	1	157
		4	158	1	157
		5	203	..	203
		6	207	1	206
		x	..	..	..
		..	1,032	22	1,010
42	W. G. Rose, Queen's-parade, Fawkner (Black Leghorns)	1	129	11	118
		2	163	..	162
		3	154	7	147
		4	157	9	148
		5	191	..	191
		6	142	13	129
		x	11	2	9
		..	947	42	905
44	Farrin Webb, "Rafa," Traralgon (Anconas) ..	1	172	..	172
		2	195	9	186
		3	81	2	79
		4	169	..	169
		5	83	6	77
		6	157	45	112
		x	..	..	..
		..	857	62	795

Section A—*continued.*

Class 3.—All Light Breeds, other than White Leghorns, Wet Mash—*continued.*

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
45	"Fulham Park" Poultry Farm (W. and J. Cockbill, (junr.), Rockbank (Black Leghorns)	1	184	75	109
		2	177	..	177
		*3	32	6	26
		4	178	3	175
		†5	78	55	23
		6	203	2	201
		x	1	1	..
		..	853	142	711

* Died 4.2.30. † Died 26.11.29.

Class 4.—Black Orpingtons, Wet Mash.

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
63	1st Prize, Champion Certificate, also Trophy, valued £8— Wingwood Poultry Yard (T. A. Goodwin), 8 Peel-street, Kew, E.4	1	225	..	225
		2	262	1	261
		3	156	1	155
		4	273	1	272
		5	191	..	191
		6	241	..	241
		x	1	..	1
		..	1,349	3	1,346
48	2nd Prize, Government Certificate, also Trophy, valued £3— E. Edwards, Main-street, Drouin	1	251	..	251
		2	172	2	170
		3	182	7	175
		4	244	..	244
		5	208	1	207
		6	197	..	197
		x	..	..	..
		..	1,254	10	1,244
47	T. L. Eastaugh, Nepean-road, Highett, S.21 ..	1	157	13	144
		2	179	1	178
		3	244	1	243
		4	246	3	243
		5	200	39	161
		6	228	1	227
		x	..	..	..
		..	1,254	58	1,196
59	J. A. Smith, 114 Arthur-street, Fairfield, N.20 ..	1	217	..	217
		2	165	4	161
		3	216	1	215
		4	187	10	177
		5	191	2	189
		6	222	..	222
		x	1	..	1
		..	1,199	17	1,182
50	C. E. Graham, Portarlington	1	193	55	138
		2	221	..	221
		3	200	10	190
		4	211	2	209
		5	180	..	180
		6	236	..	236
		x	..	..	..
		..	1,241	67	1,174

Section A—*continued.*

Class 4.—Black Orpingtons, Wet Mash—*continued.*

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
49	Miss A. M. Gray, "Wilcot," Boronia-road, Bayswater	1	109	7	102
		2	211	7	204
		3	171	15	156
		4	243	11	232
		5	221	3	218
		6	216	5	211
		x	12	5	7
		..	1,183	53	1,130
62	G. J. White, Allwell Stud Poultry Farm, Glen Waverley	1	140	1	139
		2	244	..	244
		3	95	1	94
		4	145	..	145
		*5	232	1	231
		6	233	1	232
		x	6	..	6
		..	1,095	4	1,091
56	Miss L. M. Roberts, "Urana," Pascoe Vale-road, Pascoe Vale, W.8	1	189	..	189
		2	161	1	160
		3	211	..	211
		4	171	2	169
		5	148	10	138
		6	199	..	199
		x	1	1	..
		..	1,080	14	1,066
60	A. Smith, 90 Toorak-road, South Hawthorn, E.3	1	148	..	148
		2	98	..	98
		3	153	1	152
		4	193	2	191
		5	263	..	263
		6	171	..	171
		x	6	..	6
		..	1,032	3	1,029
54	Mrs. D. Mason, Main-street, Lilydale	1	149	1	148
		2	164	3	161
		3	124	..	124
		4	155	..	155
		5	221	..	221
		6	164	..	164
		x	3	..	3
		..	980	4	976
58	A. Siede and Sons, Highett Poultry Farm, Point Nepean-road, Highett, S.21	1	148	4	144
		2	228	5	223
		†3	192	149	43
		4	223	1	222
		5	152	6	146
		6	185	5	180
		x	11	3	8
		..	1,139	173	966
55	O. Pearse, "Etker," Box 33, Donald	1	250	115	135
		2	162	41	121
		3	228	174	54
		4	227	35	192
		5	176	4	172
		6	226	9	217
		x	1	1	..
		..	1,270	379	891

* Died 5.2.30. † Died 10.2.30

Section A—*continued.*

Class 4.—Black Orpingtons, Wet Mash—*continued.*

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
57	A. W. H. Roberts, 12 Price-street, Regent, N.19 ..	1	186	..	186
		2	189	..	189
		3	165	1	164
		4	161	4	157
		5	110	..	110
		6	62	1	61
		x	..	..	..
		..	873	6	867
61	Spero Stud Poultry Farm (L. P. Branagan), Moorabbin-road, Cheltenham, S.22	1	161	1	160
		2	162	102	60
		3	162	37	125
		4	147	1	146
		5	182	5	177
		6	200	4	196
		x	2	1	1
		..	1,016	151	865
52	Miss M. T. Kidd, "The Wattles," Barker's Creek, Castlemaine	1	81	31	50
		2	246	86	160
		3	230	20	210
		4	235	95	140
		5	160	68	92
		6	223	56	167
		x	2	1	1
		..	1,177	357	820
53	H. E. Knight, Felixtowe-road, Gaza, South Australia	1	202	21	181
		2	255	126	129
		3	212	15	197
		4	240	140	100
		*5	192	2	190
		6	70	51	19
		x	4	4	..
		..	1,175	359	816
51	F. R. De Garis, Hillfred Poultry Farm, Holloway-road, Sandringham, S.8	1	165	1	164
		2	45	5	40
		3	154	5	149
		4	246	10	236
		5	144	3	141
		6	204	142	62
		x	9	..	9
		..	967	166	801
46	P. G. Caldwell, Riversdale-road (Gate House), Camberwell, E.6	1	187	3	184
		2	49	..	49
		†3	80	7	73
		4	171	3	168
		5	180	38	142
		6	178	2	176
		x	..	..	..
		..	845	53	792

* Died 13.1.30. † Died 19.11.29.

Section A—*continued.*

Class 5.—All Heavy Breeds, other than Black Orpingtons, Wet Mash

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
65	W. Donovan, 24 Regent-street, Middle Brighton, S.6 (Rhode Island Reds)	1	203	6	197
		2	171	..	171
		3	134	..	134
		*4	46	..	46
		5	217	..	217
		6	178	2	176
		x	1	..	1
		..	950	8	942
69	G. J. White, Allwell Stud Poultry Farm, Glen Waverley (Light Sussex)	1	156	11	145
		2	85	1	84
		3	216	6	210
		4	95	7	88
		5	162	..	162
		6	186	3	183
		x	10	1	9
		..	910	29	881
64	W. Cocking, Mickleham, via Broadmeadows (Light Sussex)	†1	95	72	23
		2	153	10	143
		3	165	..	165
		4	207	12	195
		5	110	41	69
		6	217	7	210
		x	2	..	2
		..	949	142	807
68	J. Walker, 128 Moran-street, Bendigo (Rhode Island Reds)	1	217	3	214
		2	159	119	40
		‡3	..	..	..
		4	125	17	108
		5	206	8	198
		6	89	7	82
		x	15	6	9
		..	811	160	651
66	W. H. Ellis, 23 Albert-crescent, Surrey Hills, E.10 (Rhode Island Reds)	1	137	1	136
		2	119	..	119
		3	143	2	141
		§4	..	..	..
		5	105	..	105
		6	136	..	136
		x	2	1	1
		..	642	4	638
70	Farrin Webb, "Rafa," Traralgon (Rhode Island Reds)	1	85	..	85
		2	114	1	113
		‖3	84	..	84
		4	1	..	1
		¶5	79	1	78
		6	151	3	148
		x	..	..	..
		..	514	5	509
67	Mrs. D. Mason, Main-street, Lilydale (Light Sussex)	1	90	88	2
		2	222	188	34
		3	180	127	53
		4	199	14	185
		5	180	48	132
		6	171	115	56
		x	7	5	2
		..	1,049	585	464

* Died 13.8.29. † Died 3.1.30. ‡ Died 30.5.29. § Died 15.7.29. ‖ Died 29.9.29. ¶ Died 26.11.29.

Section B—Individual Birds—Single Test.

Class 1.—White Leghorns, Wet Mash.

Pen No.	Competitor.	Total.	Under Weight.	1st Grade.
	1st Prize, Champion Certificate, also Trophy, valued £4—			
27	T. L. Eastaugh, Point Nepean-road, Highett, S.21	284	9	272
	2nd Prize, Government Certificate, also Trophy, valued £2			
30	G. Fraser, "Carrum," Thorpdale	276	5	271
	3rd Prize, Government Certificate—			
63	Mrs. McDonnell, 46 Childers-street, Kew, E.4	270	2	268

Other Competitors.

Pen No.	Competitor.	Total.	Under Weight.	1st Grade.
59	G. McDonnell ..	261	2	259
41	L. J. Jackson ..	264	7	257
55	G. R. Morris ..	258	4	254
28	T. L. Eastaugh	257	3	254
52	N. Meyers ..	257	5	252
60	G. McDonnell	252	1	251
16	R. R. Christie ..	250	..	250
19	P. E. Cook ..	250	1	249
79	A. H. Searls ..	251	4	247
78	Scale Bros. ..	256	11	245
46	Kadima P.F. ..	247	6	241
1	Anstis Bros. ..	250	10	240
76	T. J. Stevens	242	4	238
21	D. A. Dimmick	237	..	237
38	R. P. Hartman, Tas.	255	19	236
37	R. P. Hartman, Tas.	243	7	236
11	Rockbank P.F.	236	1	235
5	G. S. Baker	240	6	234
98	E. White ..	235	1	234
97	E. White ..	241	8	233
45	Kadima P.F. ..	236	3	233
65	H. R. McChesney	242	11	231
36	Glen Athol Orchard and P.F.	268	38	230
8	H. C. Clark ..	236	7	229
10	B. W. Craddock	229	..	229
80	A. H. Searls ..	227	1	226
31	C. R. Fagg ..	224	..	224
32	C. R. Fagg ..	226	3	223
71	O. Pearse ..	241	19	222
3	J. Brighton and Son	222	..	222
33	Don Granter ..	221	..	221
100	J. Wrathall ..	222	2	220
6	G. S. Baker ..	221	2	219
73	C. W. Pearson	228	10	218
64	Mrs. McDonnell	217	1	216
12	Rockbank P.F.	216	1	215
18	C. J. Christie ..	216	1	215
72	O. Pearse ..	213	..	213
51	N. Meyers ..	213	3	210
75	T. J. Stevens	212	3	209
23	H. W. Devlin	209	..	209
66	H. R. McChesney	218	13	205
29	G. Fraser ..	207	4	203
49	T. A. Mentiplay	206	3	203
15	R. R. Christie	201	..	201
44	F. Julyan ..	204	6	198
89	J. H. Wernli ..	201	3	198
43	F. Julyan ..	196	..	196
54	Milledge Bros.	204	9	195
4	J. Brighton and Son	200	5	195
67	Overport P.F.	194	..	194
7	H. C. Clark ..	204	11	193
92	C. H. Weller ..	197	4	193
2	Anstis Bros. ..	193	1	192
20	P. E. Cook ..	192	..	192
99	J. Wrathall ..	195	7	188
86	Spero Stud P.F.	188	1	187
35	Glen Athol Orchard and P.F.	198	12	186
22	D. A. Dimmick	186	..	186
57	L. Mackenzie	186	..	186*
88	Wyoming P.F.	186	..	186
90	J. H. Wernli ..	200	15	185
14	W. Cullen ..	184	1	183
40	B. Harrison ..	209	27	182
42	L. J. Jackson	196	14	182
82	A. Smith ..	182	..	182
81	A. Smith ..	186	6	180
17	C. J. Christie ..	217	41	176
24	H. W. Devlin	208	32	176
74	C. W. Pearson	187	11	176
48	Mrs. J. Long ..	175	3	172
93	G. D. Witham	175	4	171
61	D. McDonnell	170	..	170
85	Spero Stud P.F.	194	25	169
84	F. M. G. Starbuck	169	1	168
87	Wyoming P.F.	166	..	166
39	B. Harrison ..	192	28	164
56	G. R. Morris ..	163	3	160
77	Scale Bros. ..	254	97	157
83	F. M. G. Starbuck	157	..	157
9	B. W. Craddock	248	98	150
69	W. A. Pollerd	251	107	144
34	Don Granter ..	142	..	142
47	Mrs. J. Long ..	151	11	140
53	Milledge Bros.	152	13	139
26	J. Eddelbuttel	155	17	138
70	W. A. Pollerd	229	98	131
91	C. H. Weller ..	131	4	127
62	D. McDonnell	127	1	126
95	A. Wescombe	226	110	116
96	A. Wescombe	207	107	100
58	L. Mackenzie	88	3	85
68	Overport P.F.	133	50	83
50	T. A. Mentiplay	80	..	80
94	G. D. Witham	82	6	76
25	J. Eddelbuttel	177	126	51
13	W. Cullen ..	48	4	44†

* Died 17.1.30. † Died 7.2.30.

Section B—*continued.*

Class 2.—White Leghorns, Dry Mash.

Pen No.	Competitor.	Total.	Under Weight.	1st Grade.
	1st Prize, Champion Certificate—			
212	G. McDonnell, 46 Childers-street, Kew, E.4	262	9	253
	1st Prize, Champion Certificate—			
234	F. D. Woolcock, 217 Gold-street, Clifton Hill, N.8.. ..	253	..	253
	3rd Prize, Government Certificate—			
191	J. Brighton and Son, Stamford-road, Oakleigh, S.E.12 ..	243	..	243

Other Competitors.

Pen No.	Competitor.	Total.	Under Weight.	1st Grade.
217	W. A. Pollerd	242	4	238
198	F. G. Fereday	239	3	236
213	D. McDonnell	229	7	222
210	N. Meyers ..	224	3	221
218	W. A. Pollerd	222	3	219
225	C. Sinn ..	215	..	215
228	F. M. G. Starbuck	215	2	213
221	A. V. Ricketts	224	19	205
199	C. R. Fagg ..	204	..	204
203	Kadima P.F. ..	203	..	203
220	W. H. Rea ..	202	..	202
230	Waverley P.F.	202	..	202
223	T. J. Stevens	199	1	198
204	Kadima P.F. ..	196	1	195
229	Waverley P.F.	195	2	193
207	T. A. Mentiplay	193	..	193
224	T. J. Stevens	190	1	189
197	F. G. Fereday	217	31	186
200	C. R. Fagg ..	198	17	181
233	F. D. Woolcock	179	..	179
231	J. H. Wernli ..	181	3	178
219	W. H. Rea ..	177	..	177
195	Mrs. M. Carter	179	10	169
215	Mrs. McDonnell	176	9	167
232	J. H. Wernli ..	163	2	161
235	H. Beet ..	162	6	156
236	H. Beet ..	169	18	151
196	Mrs. M. Carter	155	9	146
201	E. Jones ..	145	2	143
216	Mrs. McDonnell	146	6	140
194	H. C. Clark ..	192	51	141
209	N. Meyers ..	199	61	138
222	A. V. Ricketts	134	..	134
202	E. Jones ..	190	62	128
208	T. A. Mentiplay	129	1	128
227	F. M. G. Starbuck	120	1	119
192	J. Brighton and Son	42	..	42*
226	C. Sinn ..	39	..	39
211	G. McDonnell..	23	..	23†
214	D. McDonnell	29	10	19
205	Mrs. O. Lett ..	1	1	‡
206	Mrs. O. Lett ..	1	1	§
193	H. C. Clark ..	..	..	§

* Died 29.10.29. † Died 14.7.29. ‡ Died 1.10.29. § Died 25.4.29.

Class 3.—All Light Breeds, other than White Leghorns, Wet Mash.

Pen No.	Competitor.	Total.	Under Weight.	1st Grade.
	1st Prize, Champion Certificate—			
101	F. W. Gough, "Honington," Arthur-street, Malvern, S.E.4 (Brown Leghorn)	234	6	228

Other Competitors.

Pen No.	Competitor.	Total.	Under Weight.	1st Grade.
105	J. B. Salmond (Black Leghorn)	225	12	213
106	J. B. Salmond (Black Leghorn)	235	27	208
108	W. R. Vivian (Brown Leghorn)	192	2	190
102	F. W. Gough .. (Brown Leghorn)	168	7	161
103	J. T. Rowley .. (Black Leghorn)	137	1	136
107	W. R. Vivian (Brown Leghorn)	149	24	125
104	J. T. Rowley .. (Black Leghorn)	89	1	88

Section B—*continued.*

Class 4.—Black Orpingtons, Wet Mash.

Pen No.	Competitor.	Total.	Under Weight.	1st Grade.
	1st Prize, Champion Certificate, also Trophy, valued £1—			
117	T. L. Eastaugh, Point Nepean-road, Highett, S.21 ..	270	...	270
	2nd Prize, Government Certificate—			
132	Morton Bros., Deep Creek-road, Mitcham	253	..	253
	3rd Prize; Government Certificate—			
122	C. E. Graham, Portarlington	258	8	250

Other Competitors.

Pen No.	Competitor.	Total.	Under Weight.	1st Grade	Pen No.	Competitor.	Total.	Under Weight.	1st Grade.
159	J. H. Wernli ..	247	1	246	140	O. Pearse ..	193	10	183
156	J. Thompson ..	246	..	246	142	C. W. Pearson	187	4	183
133	H. R. McChesney	242	..	242	167	T. R. Ward ..	192	14	178
					143	"Renwil" ..	184	6	178
164	E. White ..	237	3	234	114	R. R. Christie	179	1	178
150	"Shawville"	233	..	233	145	J. A. Smith ..	179	3	176
166	A. J. Wallace	223	..	223	131	Morton Bros.	177	5	172
129	T. A. Mentiplay	222	..	222	125	C. Hunter ..	247	76	171
160	J. H. Wernli ..	241	21	220	138	S. Palmer ..	191	21	170
155	J. Thompson ..	223	6	217*	121	C. E. Graham	171	3	168
135	"Our Home" P.F.	222	5	217	161	C. H. Weller ..	221	54	167
					134	H. R. McChesney	168	7	161†
153	Spero Stud P.F.	216	..	216					
124	"Glaston" ..	234	20	214	115	C. J. Christie ..	159	..	159
118	T. L. Eastaugh	252	40	212	170	Wingood P.Y.	158	..	158
169	Wingood P.Y.	214	3	211	126	C. Hunter ..	209	52	157
113	R. R. Christie	213	3	210	163	E. White ..	197	40	157
172	A. J. C. Anderson	209	..	209	148	A. Smith ..	158	1	157
					151	F. M. G. Starbuck	160	4	156
112	W. Cullen ..	207	1	206					
174	L. T. Phillips	207	2	205	139	O. Pearse ..	203	48	155
149	"Shawville"	203	..	203	123	"Glaston" ..	154	..	154
146	J. A. Smith ..	202	1	201	154	Spero Stud P.F.	136	3	133
110	A. E. Bailey ..	240	40	200	111	W. Cullen ..	140	13	127
168	T. R. Ward ..	213	16	197	137	S. Palmer ..	235	111	124
130	T. A. Mentiplay	212	20	192	152	F. M. G. Starbuck	94	2	92
144	"Renwil" ..	204	12	192					
171	A. J. C. Anderson	191	1	190	116	C. J. Christie ..	66	3	63
					162	C. H. Weller ..	204	150	54
147	A. Smith ..	190	..	190	157	Mrs. C. Taylor	53	..	53
120	F. W. Gough ..	191	3	188	119	F. W. Gough ..	216	170	46
165	A. J. Wallace	188	1	187	136	"Our Home" P.F.	244	204	40
173	L. T. Phillips	189	3	186					
127	F. Julyan ..	186	..	186	109	A. E. Bailey ..	233	227	6
128	F. Julyan ..	185	..	185	158	Mrs. C. Taylor	3	..	3‡
141	C. W. Pearson	185	1	184					

* Died 27.2.30. † Died 6.1.30. ‡ Died 21.12.29.

Class 5.—All Heavy Breeds, other than Black Orpingtons, Wet Mash.

Pen No.	Competitor.	Total.	Under Weight.	1st Grade.
	1st Prize, Champion Certificate—			
184	W. Tedstone, White Horse-road, Balwyn, E.8 (Rose Comb Rhode Island White)	227	..	227

Section B.—*continued.*

Class 5.—All Heavy Breeds, other than Black Orpingtons, Wet Mash—*continued.*

OTHER COMPETITORS.

Pen No.	Competitor.	Total.	Under Weight.	1st Grade.	Pen No.	Competitor.	Total.	Under Weight.	1st Grade.
182	H. G. Taylor .. (White Wyandotte)	215	2	213	185	W. Tedstone .. (Single Comb Rhode Island White)	198	43	155
186	W. Tedstone .. (Single Comb Rhode Island White)	271	71	200	181	H. G. Taylor .. (White Wyandotte)	150	6	144
178	J. C. Blyth .. (Rhode Island Red)	200	..	200	175	W. Cocking .. (Light Sussex)	149	7	142
177	J. C. Blyth .. (Rhode Island Red)	199	1	198	190	J. D. Blyth .. (Rhode Island Red)	133	..	133
188	J. Wrathall .. (Rhode Island Red)	196	..	196	176	W. Cocking .. (Light Sussex)	117	5	112
179	M. Legg .. (Single Comb Rhode Island White)	213	22	191	189	J. D. Blyth .. (Rhode Island Red)	107	5	102
180	M. Legg .. (Single Comb Rhode Island White)	204	14	190	187	J. Wrathall .. (Rhode Island Red)	83	..	83
					183	W. Tedstone .. (Rose Comb Rhode Island White)	67	..	67

For the Greatest Number of First Grade Eggs laid by Individual Birds in each Class of Section A.

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
	Class 1.—White Leghorns, Wet Mash.				
	1st Prize, Champion Certificate—				
1	Austis Bros., Hill View Poultry Farm, Spring Vale	5	263	5	258
	2nd Prize, Government Certificate—				
25	Miss L. M. Roberts, "Urana," Pascoe Vale-road, Pascoe Vale, W.8	2	252	..	252
	3rd Prize, Government Certificate—				
6	A. Cathcart, Charles-street, Burwood, E.13 ..	4	253	3	250
	3rd Prize, Government Certificate—				
15	A. J. Hill, Sunraysia Poultry Farm, Greensborough	6	250	..	250
	Class 2.—White Leghorns, Dry Mash.				
	1st Prize, Champion Certificate—				
39	A. J. Hill, Sunraysia Poultry Farm, Greensborough	4	237	1	236
	2nd Prize, Government Certificate—				
38	A. Enticknap, 38 Serrell-street, East Malvern, S.E.5	6	233	8	225
	Class 4.—Black Orpingtons, Wet Mash.				
	1st Prize, Champion Certificate—				
63	Wingood Poultry Yard (T. A. Goodwin), 8 Peel-street, Kew, E.4	4	273	1	272
	2nd Prize, Government Certificate—				
60	A. Smith, 90 Toorak-road, South Hawthorn, E.3 ..	5	263	..	263
	3rd Prize, Government Certificate—				
63	Wingood Poultry Yard (T. A. Goodwin), 8 Peel-street, Kew, E.4	2	262	1	261

Certificates of Merit.

SECTION A.

For those not entitled to any other certificate a 1st class certificate of merit was awarded to pens which averaged 200 1st grade eggs, and to individual birds which laid 220 1st grade eggs.

SECTION. B.

A 1st class certificate of merit was awarded to those birds which were not entitled to any other certificate and which laid 240 1st grade eggs.

DUCKS.

Certificates were awarded for the greatest number of 1st grade eggs laid provided that, in Section A, a team of six birds laid not less than 1,200 1st grade eggs, and, in Section B, to teams of three birds which laid not less than 600 1st grade eggs. No certificate was awarded in the case of any bird which laid less than 220 1st grade eggs. By a 1st grade egg is meant one weighing not less than 2 ounces.

Section A—Groups of Six Birds—Single Tested.

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
13–18	1st Prize, Champion Certificate— Broadleigh Egg Farm (L. G. Broadbent), Heatherton-road, Springvale (Khaki Campbells)	*13	92	..	92
		14	272	2	270
		15	227	1	226
		16	277	..	277
		17	280	1	279
		18	293	..	293
		..	1,441	4	1,437
7–12	2nd Prize, Government Certificate— R. Isworth, 14 Union-street, Preston, N.18 (Fawn Indian Runners)	7	219	..	219
		8	229	..	229
		9	215	..	215
		10	198	..	198
		11	239	1	238
		12	235	..	235
		..	1,335	1	1,334
1–6	3rd Prize, Government Certificate— M. G. Leech, Trevallyn Poultry Farm, Sydney-road, Campbellfield (Khaki Campbells)	1	282	..	282
		2	4	..	4
		3	307	2	305
		4	285	3	282
		5	243	..	243
		6	203	1	202
		..	1,324	6	1,318
19–24	W. L. Newton, "Ashley Hill," Woodstock, via Donnybrook (Fawn and White Runners)	19	197	2	195
		20	155	1	154
		21	162	..	162
		22	170	..	170
		23	263	..	263
		24	144	..	144
		..	1,091	3	1,088

* Died 5.8.29.

DUCKS—*continued.*

Section A—Groups of Six Birds—Single Tested.—*continued.*

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
25–30	Orana Poultry Farm (G. Crawford), Mitcham (Khaki Campbells)	25	193	..	193
		*26	112	..	112
		27	184	..	184
		28	145	..	145
		29	276	..	276
		30	159	1	158
		..	1,069	1	1,068
31–36	Mrs. M. Burns, Roschill Duck Farm, Spring Vale (Rouens)	31	182	..	182
		32	153	..	153
		33	171	..	171
		34	93	..	93
		35	154	..	154
		36	175	..	175
		..	928	..	928

* Died 30.9.29.

Section B—Groups of Three Birds—Single Tested.

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
49–51	1st Prize, Champion Certificate—M. G. Leech, Trevallyn Poultry Farm, Sydney-road, Campbellfield (Khaki Campbells)	49	298	..	298
		50	278	..	278
		51	267	..	267
		..	843	..	843
40–42	2nd Prize, Government Certificate—J. Hayes, cr. Herald and Bernard streets, Cheltenham, S.22 (White Indian Runners)	40	208	1	207
		41	236	..	236
		42	228	..	228
		..	672	1	671
43–45	R. Isworth, 14 Union-street, Preston, N.18 (Fawn Indian Runners)	43	185	..	185
		44	226	..	226
		45	158	1	157
		..	569	1	568
37–39	E. Clarke, Three Chain-road, Mornington (Khaki Campbells)	37	229	..	229
		38	293	..	293
		*39	1	1	..
		..	523	1	522
52–54	Miles and Veitch, "Yutha," Earlsfield-road, Hampton, S.7 (Khaki Campbells)	52	145	..	145
		†53	127	..	127
		54	223	..	223
		..	495	..	495
46–48	H. J. Leigh, Howitt-street, Ballarat (White Indian Runners)	46	91	..	91
		47	180	..	180
		48	66	..	66
		..	337	..	337

* Died 29.10.29. † Died 4.1.30.

DUCKS—*continued.*

Section B—Groups of Three Birds—Single Tested—*continued.*

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
55–57	J. Peters, Kingston-road, Heatherton (Rouens) ..	55	..	..	..
		56	143	..	143
		57	159	..	159
		..	302	..	302
58–60	Mrs. W. Whitford, Rupert-street, Mitcham (Khaki Campbells)	58	116	..	116
		*59	22	1	21
		60	70	..	70
		..	208	1	207

* Died 14.9.29.

For the Greatest Number of 1st Grade Eggs laid by Individual Birds in Sections A and B.

Pen No.	Name and Address.	Bird No.	Total Eggs.	Under Weight.	Total 1st Grade Eggs.
	Section A—Groups of Six Birds—Single Tested.				
1–6	1st Prize, Champion Certificate— M. G. Leech, Trevallyn Poultry Farm, Sydney-road, Campbellfield (Khaki Campbells)	3	307	2	305
13–18	2nd Prize, Government Certificate— Broadleigh Egg Farm (L. G. Broadbent), Heatherton-road, Springvale (Khaki Campbells)	18	293	..	293
1–6	3rd Prize, Government Certificate— M. G. Leech, Trevallyn Poultry Farm, Sydney-road, Campbellfield (Khaki Campbells)	1	282	..	282
1–6	3rd Prize, Government Certificate— M. G. Leech, Trevallyn Poultry Farm, Sydney-road, Campbellfield (Khaki Campbells)	4	285	3	282
	Section B—Groups of Three Birds—Single Tested.				
49–51	1st Prize, Champion Certificate— M. G. Leech, Trevallyn Poultry Farm, Sydney-road, Campbellfield (Khaki Campbells)	49	298	..	298
37–39	2nd Prize, Government Certificate— E. Clarke, Three Chain-road, Mornington (Khaki Campbells)	38	293	..	293
49–51	3rd Prize, Government Certificate— M. G. Leech, Trevallyn Poultry Farm, Sydney-road, Campbellfield (Khaki Campbells)	50	278	..	278

CORRECTION.

In this *Journal* for June, page 349, it was stated that, in Section B, Class 2, White Leghorns—Dry Mash, Mr. G. McDonnell, of Kew, was awarded first, and Mr. F. D. Woolcock, of Clifton Hill, second place.

This was an error, and it should have been stated that Mr. McDonnell and Mr. Woolcock tied for first place.

Mr. McDonnell's bird laid 262 eggs during the period of the Competition, but nine of them were under-weight, and therefore she

Mr. F. D. Woolcock's White Leghorn—Awarded Second Place in Section B, Class 2.

could be credited with only 253. Mr. Woolcock's bird laid a similar number—all first grade; thus a tie was created.

A photograph of Mr. Woolcock's bird is reproduced above.

ROCHESTER IRRIGATION FARM COMPETITION 1929-30.

By J. Barrett, State Rivers and Water Supply Commission, and L. C. Bartels, B.Ag.Sc., Department of Agriculture.

There was no lessening of interest in the second irrigated farm competition conducted by the Rochester Agricultural Society, and a definite improvement must be recorded in the case of many entries.

The farms inspected covered a wide area, from Bamawn extension to the limits of Nanneella Estate. There was a considerable range in soil types, and also in the class of farming practised, but most of the farms inspected were dairy farms.

Rochester has been noted for its dairy stock, and the keenness displayed by most settlers in showing their herd-test records was an indication of their endeavours to improve.

Good agricultural practice was in evidence on most farms. On the Bamawn side, the dairy-farming settlers grow lucerne mainly. On the whole, they are better favoured as regards soil, the deep sandy loams which are common there being very well suited to lucerne growing. These soils absorb water freely, and the lucerne roots are able to penetrate deeply, so that one watering will suffice for at least one growth of lucerne. Grasses and clovers require more frequent watering, and there is a likelihood of loss through deep percolation and a subsequent rise of the water table. There is no doubt that pastures will extend through Bamawn; in fact, white clover will spread naturally, but it behoves farmers who contemplate sowing them on light soils to prepare the land thoroughly and grade well, so that waste of water may be avoided. Particular attention should be paid to the amount of water used, and a warning is given that the supplementary irrigations which have been recommended for the heavier soils should not be practised where the ground takes 4 inches and more at a watering. Four or 5 inches is a good watering to give, and farmers should endeavour to restrict their irrigations to that quantity. Heavier irrigations will induce greater growth, but the quality of the lucerne will not be so good; moreover, excessive waterings shorten the life of the stand. The fact that white clover comes in to replace the lucerne may not be a benefit for the reasons indicated—the water is likely to percolate away or raise the water table beyond desirable limits.

On the Nanneella Settlement, seeded pastures have been widely adopted; in fact, some of the settlers there must be regarded as pioneers of the movement in the north. Mr. Tom Edge sowed grasses and clovers ten years ago.

The extension of the area under pastures is based on experience of their value. On appearances it is sometimes difficult to appreciate the productive capacity of these grasses and clovers, but careful records of stock grazed, or of milk and butter produced, leave no doubt on the matter. To determine approximately the amount of feed available to stock in successive grazings of irrigated pastures, mowing tests have been instituted at the State Research Farm, Werribee. The results will be published in due time, and already sufficient evidence is available to show that a very high yield is obtained under proper management, while analyses of the fodder confirm the statements that the short bite of an intensively grazed pasture has nutrient elements of fodder in a concentrated form. Of course, this high production represents a heavy drain on the mineral matter of the soil, and the big yields can be sustained only by liberal manuring.

There is no doubt that the value of irrigated pastures has become apparent, mainly through the extension of top-dressing. Some of the farmers in the Rochester district are tardy in learning the value of superphosphate, and this was evident on several farms in the sparse growth of lucerne and the prevalence in the stand of such weeds as windmill grass and the love grasses. The growth on many of these lucerne fields could be doubled if liberal manuring were adopted and the lucerne allowed to grow to cutting stage and mowed occasionally.

The experimental plots at Nanneella conducted during the 1924-25 and 1925-26 seasons demonstrated the value of superphosphate, and the lessons should be applied. Even 4 cwt. of superphosphate

per acre was shown to be a payable dressing, and this has been confirmed in subsequent tests. Indeed, it has been very well illustrated on the farms of some of the competitors, who have adopted a practice of liberal manuring and changed the appearance of their blocks since last season.

The benefits of top-dressing are manifold. Besides making good the drain on the soil—phosphorus represented in the milk, beef and mutton produced—manure increases yield, improves the palatability and feeding value of herbage, induces better winter growth and extended life of perennial plants, leads to healthier stock, and the suppression of weeds. If the benefits were confined to any one of the above, it would repay the cost of the manure.

The inspections showed that the necessity for liberal manuring is evident on several farms.

It is interesting to note that several species of native grass which have their natural habitat in northern New South Wales and Queensland are finding the irrigated conditions congenial, and are becoming very prominent; examples are graceful panic grass and plain grass. These are widespread in the Rochester district during the summer season.

The Leading Farms.

Mr. M. D. Aitken maintained his position, and was again awarded first prize. He has a block of 41 acres, which he has occupied for ten years. It is truly a mixed farm, with dairying, fruit growing, poultry keeping, and pig raising all being undertaken. Mr. Aitken has two orchards. One was planted in citrus last year, and an older orchard includes 2½ acres of peaches and 3 acres of apricots. The remainder of the farm was in lucerne, except 4 acres, which had grown oats and was prepared for sowing pastures.

There were nine paddocks. Fences and channels were in good order. The whole of the lucerne received superphosphate at the rate of 1½ cwt. per annum, and one paddock of 3 acres was given 4 cwt. per annum and responded wonderfully. About 85 acre-feet of water is used in a season. During last summer, the lucerne was watered at intervals of a fortnight to three weeks. Ten cows were milked. The herd is under test, and the returns for last season were £22 10s. per cow. In addition, the block supported three Jersey cross heifers and three horses. Three hundred White Leghorn hens were housed in a well-appointed shed, 72 feet long by 16 feet wide. This shed has a cement floor. The farm buildings and yard were very neat, and the dairy was a model of cleanliness. Vehicles and implements were under cover. There was a splendid reserve of lucerne and oaten hay.

Mr. F. W. Williams has several activities on a block of 67 acres. All of the area, except the land around the homestead and orchard, is under mixed pasture. He milks 23 cows. The butter-fat average from these under the herd test was 350 lb. Mr. Williams has had Jersey bulls for seven years, and a Jersey bull and heifer were recently bought and added to the herd.

The young cattle include five heifers and seven calves. Three horses are kept. Pigs on hand were six brood sows and a Tamworth boar. There were 50 young ones—the number usually carried. Farm

buildings were neat and efficient, and a good supply of hay was in reserve. A feature of this farm is the pastures, which include paspalum everywhere, with a strong admixture of rye grass and strawberry and white clovers. These pastures have been top-dressed with 3 cwt. of superphosphates in alternate years, and some of the paddocks have been mowed at intervals. Sulphate of ammonia was applied to 4 acres, with results encouraging to Mr. Williams.

Mr. J. J. Desmond has a farm of 60 acres. It is subdivided into eighteen paddocks, including 6½ acres of orchard and 15 acres of lucerne—6 acres was in fallow and 12 acres in clover and rye. The remainder was in old lucerne and mixed lucerne and grasses. Mr. Desmond was milking eighteen cows—fourteen pure Jerseys and four grade Jerseys. Factory returns last year totalled £480. Several old cows and six heifers were sold, but there were still on the block, in addition to the milkers, ten head of young stock and three horses. Pigs on hand at inspection time were four Berkshire sows and a Tamworth boar, with fifteen well-grown store pigs.

BEST AREA OF LUCERNE.

Mr. H. Crumpler showed the best area of lucerne. His land is a sandy loam, and takes water well. The lucerne is watered once every month, and grazed at monthly intervals at a stage when it is cleanly eaten and there is very little waste. Mr. Crumpler applies one bag of superphosphate to the whole area in alternate years.

Mr. W. J. Doyle also had for inspection a very nice area of lucerne.

BEST AREA OF PASTURE.

Messrs. Patterson Bros. showed a very good paddock of seeded pasture, which was awarded first prize. There was a dense sole, mainly rye grass and white clover, the layout was good, and the condition reflected attention to watering and manuring. On other parts of this farm were to be seen some excellent growths of subterranean clover, and in watercourses strawberry clover was firmly established.

BEST FENCING.

Mr. G. Burke, Lockington, had his fences in excellent condition. The posts were 20 feet apart, with three droppers between. The droppers were bored, and five No. 8 black wires and a barbed wire were used. The gates were a particular feature, and there was not much difficulty in allotting first prize in the section for best fencing.

BEST KEPT ORCHARD.

Mr. R. Low is a successful orchardist. He has a block of 64 acres—27 acres is in orchard—arranged as follows:—

Citrus—11 acres (mostly Navel oranges).
Peaches—6 acres.
Pears—
  William Bon Chretien—3 acres.
  Packham's Triumph—1 acre.
  Josephine—½ acre.
Apricots—2½ acres—Moorparks, Mansfield, and Ullin's.
Apples—1 acre.
Prunes, &c., make up the balance.

Cultivation is performed with a tractor. Mr. Low applies bone and superphosphate and sulphate of ammonia at the rate of 5 cwt. per acre; 3 acres have been top-dressed with gypsum at 2 tons per annum. Water used averages 18 inches per annum.

Apricots sold amounted to 7 tons; but Mr. Low estimates that he lost 7 tons. He had 22 tons of pears, 20 tons of peaches, 3 tons of apples, and 400 cases of lemons, and 250 cases of oranges.

Best-kept Homestead.

The award for the best-kept homestead and farm buildings was a difficult one to make, in that the home surroundings of two of the competitors were particularly good. Messrs. Bolshaw and Patterson Bros. were awarded equal points. Mr. Bolshaw's garden was considered slightly better, but his farm buildings were not quite so good as those of Messrs. Patterson Bros. Mr. Bolshaw's house and garden occupied the best part of an acre of ground, and made a very attractive display with a wonderful range of trees, shrubs, and flowers, including a fine collection of roses. It was well looked after, and showed that much thought and effort had been put into it by Mr. and Mrs. Bolshaw. Messrs. Patterson Bros.' garden made up in quality what it lacked in expanse. The choice of flowers and the cultivation were good.

Freedom from Weeds.

Both the farms of Messrs. Bolshaw and that of the Messrs. Patterson Bros. were big, but both showed a freedom from noxious weeds—a condition due to the persistency of the owners in their efforts at eradication. The judges compromised by dividing the prize.

Best-kept Poultry Shed.

Mr. Christie, of Nanneela, keeps 1,500 White Leghorns and 300 Black Orpingtons. One of his sheds is 210 feet long by 13 feet wide. The roof has a 2-ft. overlap. The pens are 8 feet high in front and 7 feet at the back. The shed is divided into pens 15 feet long. Large self-feeders and automatic watering system are installed. The perches are on iron pegs, and the timber is oiled.

Several of the competitors have good poultry sheds, but the prize was awarded to Mr. Christie.

Best-kept Piggery, including Conveniences for Feeding and Handling.

Mr. J. Reid, of Nanneella Estate, was awarded first prize for the best-kept piggery. His sties and layout have features which have been advocated for years by Mr. J. Roy, of the State Rivers and Water Supply Commission. The designer has remembered that pigs are cleanly animals if only given clean surroundings, that they are worthy of more consideration in regard to winter housing than is usually given to them, and that grazing pigs on lucerne will be conducive to good health and enable a farmer to rear them cheaply.

The system adopted by Mr. Reid is designed for bringing pigs to the bacon stage. The sties are situated on a 4½-acre block of lucerne. This area is subdivided into four single-acre paddocks—two on each side of a central lane. On one side of the lane are the three breeding pens and the "growing" pen, on the other side there are three topping-off pens and a house for brood sows. All the pens face the east.

Rochester Irrigated Farm Competition.

AWARDS OF JUDGES—TWO INSPECTIONS—AVERAGED.

Name of Competitor.	General Layout of Ground for Irrigation—Convenience for Handling Dairy Herd Sheep, Orchards.	Percentage of Land under Cultivation.	Returns from Produce of Farm and General Condition of Stock or Trees.	General Control of Water, including state of Channels and Drains.	Dairymen or Sheep Farmers—Conservation of Fodders.	Orchardist—Provision of Green and Artificial Manure.	Dairymen or Sheep Farmers—Poultry and Pigs.	Orchardist—Cultivation and care of Orchard.	Fences.	Farm Buildings.	Freedom from Weeds.	Care of Implements.	General Appearance of Immediate Surroundings of Dwellings.	Total.
Possible Points ..	**50**	**40**	**30**	**30**	**30**	**30**	**30**	**30**	**20**	**20**	**20**	**15**	**15**	**360**
Aitken, M. ..	46	36	27	25	30	..	23	..	19	18	18	14	12	268
Williams, F. W. ..	38	33	30	24	30	25	16	25	16	18	16	14	13	257
Desmond, J. J. ..	43	35	29	24	30	..	16	..	17	14	18	10	7	243
Davis, J. T. ..	36	34	27	25	30	..	16	..	17	17	18	10	9	239
Pierce, J. D. ..	42	36	28	24	26	..	18	..	17	12	17	8	9	237
Firth Bros. ..	39	30	25	23	29	..	14	..	16	19	18	14	10	237
Clymo, R. C. ..	40	32	28	22	29	..	20	..	15	14	16	8	11	235
Watson, E. ..	40	32	24	22	26	..	19	..	16	13	18	10	7	227
Burke, G. ..	44	29	22	21	10	..	17	..	20	18	18	13	13	225
Patterson Bros. ..	39	25	25	23	20	..	7	..	17	18	18½	13	14	219½
Bolshaw, H. ..	39	27	26	20	15	..	12	..	16	17	18½	10	15	215½
Jarvie, C. ..	33	24	27	18	26	..	20	..	13	15	16	9	12	213
Brown, A. E. ..	35	25	24	20	25	..	24	..	13	15	14	8	8	211
Edge, T. ..	38	29	24	20	20	..	20	..	15	14	12	9	7	208
Edwards, R. T. ..	37	24	22	23	15	..	24	..	17	15	13	9	9	208
Brookes, W. ..	36	30	27	18	18	15	12	20	13	13	12	10	10	207
Crumpler, H. ..	41	38	28	25	..	..	..	..	15	14	18	12	11	202
Harrison, E. ..	33	25	20	21	5	..	10	..	17	15	17	12	11	186

The breeding pens have a floor space of 21 feet x 8 feet, and include a shed 8 feet x 8 feet, a feeding compartment of similar dimensions, and a compartment of 8 feet x 5 feet in which the young pigs are fed. The floor is raised 9 inches to a foot from the ground, and the floorboards are close in the winter. The "growing" pen is 24 feet x 12 feet, comprised of sleeping compartment, gangway, and feeding. This pen opens on to either of two lucerne paddocks, which are irrigated alternately. The topping-off pens are 17 feet x 8 feet, and are divided into two—the sleeping part, 8 feet x 8 feet, and the feeding part, 9 feet x 8 feet. Three brood sows farrow about the same period. The young ones are kept in the farrowing pens until weaned, at about the age of two months. Another three sows come in about a month after the first lot are removed. The aim is for each sow to have two litters a year. The young pigs remain in the growing pen for three months. They have access to the two single-acre paddocks, which are grazed alternately. They go into the topping-off pens when five months old, eight in each pen, sorted according to development; on the average, a month is required for "topping-off."

The brood sows graze the lucerne, and once a day Mr. Reid gives them ground barley mixed with pollard. This mixture is soaked in milk, if available, and the proportion of pollard to barley is varied. An occasional spraying keeps the pens free from vermin. Mr. Reid maintains that his system of housing and feeding has the following advantages:—Feed bills are brought down; the pigs are healthy; there is no drainage worry; and once a month is sufficiently frequent to shift the straw litter.

FUMIGATION OF CITRUS TREES.

RESULTS OF SIX YEARS' WORK.

By S. A. Cock, Citriculturist.

Since 1924 one of the activities of the Citrus Branch of the Horticultural Division of the Department of Agriculture has been the fumigation of citrus groves in different parts of the State. Hereunder the reasons are given why, in the first place, the Department undertook this work, and also a short account of what has been accomplished during the past six years.

At the Citrus-growers' Conference held in 1924, at which all the principal citrus-growing districts in Victoria were represented by their association delegates, a general discussion on the subject of the control of the red scale showed that the growers were unable to successfully combat this pest by the use of oil emulsions or other sprays, and by a unanimous vote, the Department of Agriculture was asked to provide the necessary equipment for the work of fumigating trees with hydrocyanic acid gas as a a means of control. The conference further decided that, as red scale was increasing to such an extent as to become a menace to the citrus industry, the Government be requested to make the fumigation compulsory.

The requests, on being submitted to the then Minister of Agriculture, were acceded to, and outfits were procured for carrying out the work

during the season of 1924-25. The regulations under the *Vegetation and Vine Diseases Act* 1915 (No. 2744) were amended, giving orchard inspectors power to direct a grower to fumigate his trees, and if his direction were not carried out within a reasonable time, to permit the inspector to have the work done at the owner's expense.

It is gratifying to be able to state that very little compulsion has been necessary in the case of the groves which have been treated up to the present time. There appears, however, to be a misunderstanding by some growers in relation to the compulsory regulations; it will probably, therefore, be as well to give these regulations verbatim. They are as follow:—

> "All trees or plants affected by scale insects shall be sprayed with an approved scalicide or fumigated with an approved fumigant. In the case of deciduous trees these must be sprayed during the dormant season, with lime sulphur, miscible oil, or an approved insecticide."
>
> "Subsequent sprayings shall be given at intervals if deemed necessary, by an inspector. In the case of citrus and evergreen trees, all affected trees shall be sprayed with an approved scalicide, or fumigated with an approved fumigant, or treated otherwise as may be directed by an inspector."

Supervision.

The Citrus Supervisors controlling the fumigation are gazetted as Inspectors under the Vegetation and Vine Diseases Act, and, for the purpose of efficiently carrying out the work of red scale control, use discretionary powers as to whether fumigation or spraying is necessary. It is essential in a campaign against the pest to see that, in places where groves are massed or adjacent to each other, there shall be, as far as possible, a complete elimination of scale from every infested tree, so as to safeguard every grove. In such cases, fumigation with hydrocyanic acid gas is required to be carried out. Where odd trees or trees in isolated groves are only slightly infested, spraying with an approved scalicide is essential. If infested trees have been so neglected as to become worthless, their destruction is suggested.

The supervisors are trained men, and in carrying out their duties, first make a census of the infested trees in any particular grove. The grower is then told the number of trees requiring attention, and the cost of performing the work. If he possesses a fumigation outfit, he, of course, will carry out the work himself, but it must be to the satisfaction of the supervisor. Where the work is carried out by the Government outfit, a grower is called upon to sign an agreement as between himself and the Department of Agriculture for the performance of the work, and the fumigation is then done under the direction of the supervisor.

For the purposes of supervising the Citrus Industry, the State of Victoria is divided into four districts. These districts are Mildura, Swan Hill, Shepparton, and the Southern and North Central district.

The Mildura district embraces Mildura, Irymple, Red Cliffs, and Merbein.

The Swan Hill district includes Nyah, Swan Hill, Tresco, Kangaroo Estates, and Murrabit.

The Shepparton district—Cobram, Shepparton, Tatura, and Wangaratta.

The Southern and North Central district—Doncaster and surrounding districts, Bamawm, Rochester, Echuca, Stanhope and Kyabram.

Cost of Fumigation, &c.

During the term that fumigation has been compulsory, some 193,000 trees have been fumigated by the Government outfits, at an average cost per tree of 2s. 2¾d. The total amount paid by growers to the Department of Agriculture to the present time (5th June, 1930) is £21,579 6s. 8d.

Recent statistics show that there are approximately 900,000 citrus trees in Victoria. Allowing for those that have been privately fumigated (probably about 10,000), and for trees that have been re-fumigated (say 45,000), it would appear that the number of infested trees in the State, prior to the compulsory campaign against red scale, was approximately 17 per cent. of the planted trees.

The Government equipment comprises 195 sheets. These sheets are of three sizes—56 feet, 45 feet, and 36 feet. They are made of 8-10 oz. army duck, and are octagonal in shape. It is considered that a sheet will last long enough for the treatment of 1,000 trees.

The materials used for fumigating are cyanogas, known under the trade names of A. dust and G. fumigant. The A. dust is used chiefly on orange, mandarin, and grape fruit trees, and the G. dust on lemon trees. Cyanogas is applied at a strength of 1 oz. (by weight) to every 100 cubic feet of enclosed space.

The work of fumigation begins, according to the condition of the young fruit, usually late in December or early in January, and finishes in late April or early May, by which time temperature and humidity are such that fumigation is liable to cause injury to the foliage and fruit of the trees. When weather conditions are suitable, the work begins at sundown, and continues throughout the night. Any temperature of 50° or over, with a humidity reading of less than 75° Fahr., is considered suitable. If the temperature falls below 50° or the humidity exceeds 75°, fumigation should cease. Fumigation work must not be carried out during windy weather or under wet conditions. In all, there are six outfits, comprising 30 sheets or over, operating in the districts named. Each outfit employs an average of five men, one of whom acts as foreman; thus, when all the equipment is in use, there are six foremen and 24 labourers employed.

Fumigation is Successful.

Growers frequently express doubts as to whether fumigation is successful in completely eliminating scale.

The scale insect attaches itself firmly to the leaf, limb, and fruit, and, even when killed, does not fall off for some time. Wind and rain ultimately remove the dead scales.

The practical test of fumigation is whether it prevents re-infection during the following January and February. It is possible to obtain a kill of a hundred per cent., but this is not common. Factors, such as unsuitable weather conditions, and the resistance of red scale at certain periods of growth make complete elimination by one fumigation

very unlikely. What is known as the "second moult" of the insect, is the time at which it is most difficult to procure a good kill.

In California the resistance of red scale to sprays and fumigation causes much concern, and Professor Quayle (than whom, probably, no greater authority on red scale control is known) has just recently advised, in what are known as "resistant scale" districts, the spraying first with an oil emulsion, followed almost immediately by fumigation. By this means a kill of from 97 to 98 per cent. is achieved. The use of an oil emulsion has not yet been found necessary in Victoria, as fumigation alone has been proved effective in 97 or 98 per cent. of the groves treated.

From the experience gained in the six years of fumigation work in Victoria, it can be definitely stated that the disease is now well under control. Evidence of this is to be found in the extremely small amount of red-scale-infested fruit offered for sale in the metropolis and elsewhere.

Growers should Assist Themselves.

By fumigation the insects can be controlled. When once red scale enters a grove, or community of groves, it is rarely ever completely eliminated. Growers should, therefore, the next year, follow up the fumigation by spraying with white oil emulsion every tree showing signs of infection. This will keep the disease from spreading to any extent.

It must be remembered—

(1) That fumigation by the use of hydrocyanic acid gas is the surest method of control; (2) that successful fumigation can be carried out only at certain periods and under favorable conditions; (3) that while it gives a kill of approximately 97 or 98 per cent., the few scales that remain alive will rapidly increase unless measures are taken to check them; (4) that the Government outfits aim at placing the grower in control of the scale insects; (5) that it costs money for the grower to fumigate for the scale, and, therefore, efforts should be made to see that every fumigation is as effective as possible.

Growers are strongly urged to assist the Government in combating the pest. The best way they can do this is by having infested trees fumigated, and then noting carefully during the next fruit-picking season those trees whereon scale infection is showing, and spraying them as suggested during January or February following. If fumigation is not followed by the spraying of those trees showing signs of infestation, another thorough re-fumigation will be necessary within three years. But if growers spray or spot-fumigate after a general fumigation, possibly another general fumigation may not be necessary for five or six years.

At Mildura and some other places, the red scale has also infested garden shrubs, deciduous fruit trees, and vines growing adjacent to the citrus trees. As it is not possible to fumigate these plants, it is earnestly recommended that they be sprayed during the dormant season with oil emulsion of the customary winter strength. This will guard very largely against re-infection of the citrus trees during the summer months; it will assist the growers in reducing the necessity for more frequent fumigation, and thus aid them financially.

SOMNER'S TIP TOP SEEDS

Splendid Time to Plant

GRASSES
for
SWAMPY LANDS

Poa Aquatica

THE WONDERFUL WATER MEADOW or SWAMP GRASS

This grass has valuable fodder properties, and will give several cuttings in the season. It is strictly perennial, grows to a height of six to seven feet, has long, strong, underground-creeping roots, and **overcomes all native swamp growths.** It is reclaiming intractable swamps infested by rushes, reeds, sedges, and sword grass with wonderful results.

Strong Roots, 30/- per sack; ½ sack, 16/- (Write for special circular.)

STRAWBERRY CLOVER

Suitable to most soils, but grows best in damp, heavy ground. Very fattening. Makes splendid hay. **Roots, 15/- per 1,000; 25/- bag. (Shelled seed, 7/6 lb.)**

POA FLUITANS

(Manna or Floating Sweet Grass)

A valuable grass for open swamps. Extremely valuable feed. One of the richest grasses for feeding value known.

Roots, 35/- sack; ½ sack, 20/-

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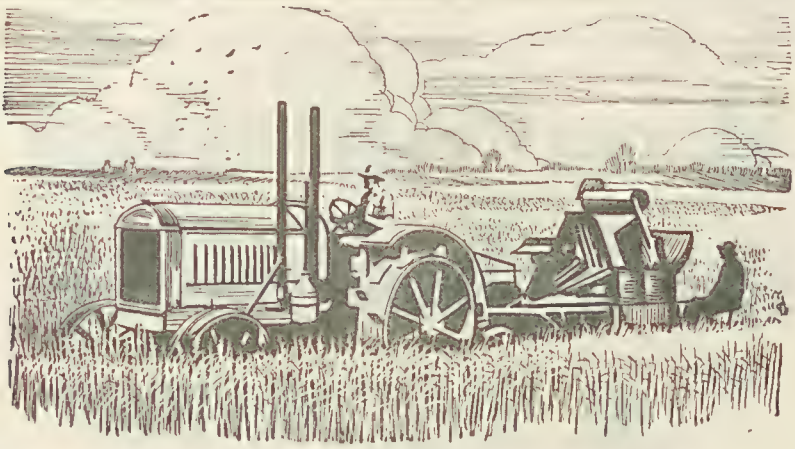

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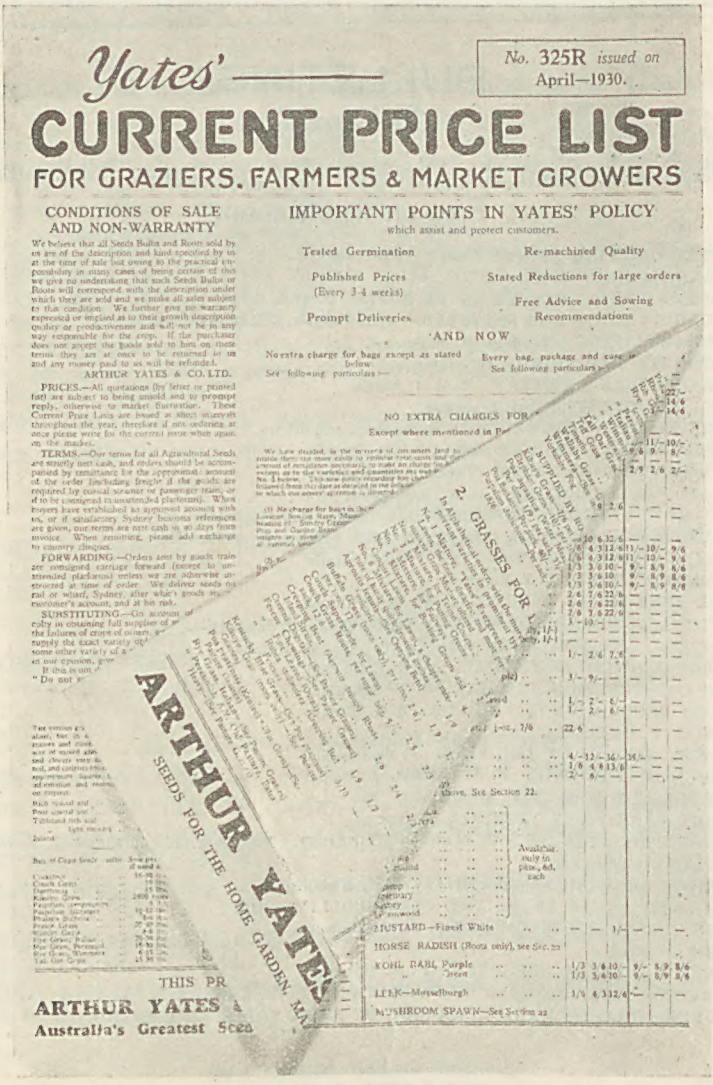

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